

OM-4429

216 138N

2008-09

Processes



Stick (SMAW) Welding



TIG (GTAW) Welding



MIG (GMAW) Welding



Flux Cored (FCAW) Welding



Air Carbon Arc (CAC-A)
Cutting and Gouging

Description



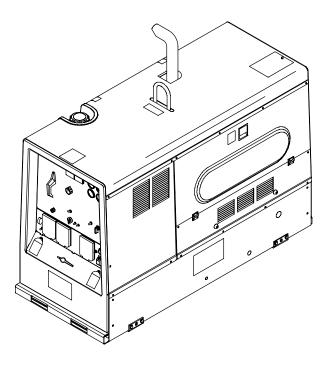




Engine Driven Welding Generator

Big Blue 500 PT Big Blue 600 X

(Perkins Turbo-Powered)





OWNER'S MANUAL

File: Engine Drive



From Miller to You

Thank you and congratulations on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite.



Miller is the first welding equipment manufacturer in the U.S.A. to be registered to the ISO 9001:2000 Quality System Standard.

We've made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide the exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.

Miller Electric manufactures a full line of welders and welding related equipment. For information on other quality Miller

products, contact your local Miller distributor to receive the latest full line catalog or individual specification sheets. To locate your nearest distributor or service agency call 1-800-4-A-Miller, or visit us at www.MillerWelds.com on the web.



Working as hard as you do – every power source from Miller is backed by the most hassle-free warranty in the business.



TABLE OF CONTENTS

| SECTIO | N 1 - SAFETY PRECAUTIONS - READ BEFORE USING | 1 |
|--------|----------------------------------------------------------------------------------------------|----|
| | | |
| 1-1. | Symbol Usage | 1 |
| 1-2. | Arc Welding Hazards | 1 |
| 1-3. | Engine Hazards | 3 |
| 1-4. | ' | 3 |
| | Additional Symbols For Installation, Operation, And Maintenance | 4 |
| 1-6. | California Proposition 65 Warnings | 5 |
| 1-7. | Principal Safety Standards | 5 |
| 1-8. | EMF Information | 5 |
| | N 2 - CONSIGNES DE SÉCURITÉ - LIRE AVANT UTILISATION | 6 |
| 2-1. | Signification des symboles | 6 |
| 2-2. | Dangers relatifs au soudage à l'arc | 6 |
| 2-3. | Dangers existant en relation avec le moteur | 8 |
| 2-4. | Dangers liés à l'air comprimé | 9 |
| 2-5. | Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance | 9 |
| 2-6. | Proposition californienne 65 Avertissements | 11 |
| 2-7. | Principales normes de sécurité | 11 |
| 2-8. | Information EMF | 11 |
| SECTIO | N 3 – DEFINITIONS | 12 |
| 3-1. | Warning Label Definitions (For Wordless Labels) | 12 |
| 3-2. | Symbols And Definitions | 13 |
| SECTIO | N 4 - SPECIFICATIONS | 14 |
| 4-1. | Weld, Power, And Engine Specifications | 14 |
| 4-2. | Dimensions, Weights, And Operating Angles | 14 |
| 4-3. | Volt-Ampere Curves For CC Models | 15 |
| 4-4. | Volt-Ampere Curves For CC/CV Models | 16 |
| 4-5. | Fuel Consumption | 17 |
| 4-6. | Duty Cycle And Overheating | 17 |
| 4-7. | AC Generator Power Curve | 18 |
| 4-8. | Optional Three-Phase Generator Curves | 18 |
| SECTIO | N 5 – INSTALLATION | 19 |
| 5-1. | Installing Welding Generator | 19 |
| 5-2. | Mounting Welding Generator | 20 |
| 5-4. | Rating Label Location | 21 |
| 5-5. | Using Lifting Eye | 22 |
| 5-6. | Installing Exhaust Pipe | 22 |
| 5-7. | Activating The Dry Charge Battery (If Applicable) | 23 |
| 5-8. | 0 , | 23 |
| 5-9. | Engine Prestart Checks | 24 |
| 5-10. | Connecting To Weld Output Terminals | 25 |
| 5-11. | Selecting Weld Cable Sizes* | 26 |
| 5-12. | Connecting To Remote Amperage Adjust Receptacle RC13 On CC Models | 26 |
| 5-13. | Connecting To Remote 14 Receptacle RC14 On CC/CV Models | 27 |
| SECTIO | N 6 - OPERATING WELDING GENERATOR - CC MODELS | 28 |
| 6-1. | Front Panel Controls For CC Models (See Section 6-2) | 28 |
| 6-2. | Description Of Front Panel Controls For CC Models (See Section 6-1) | 29 |
| 6-3. | Remote Amperage Control On CC Models (Optional) | 30 |
| 6-4. | Weld Control/Arc Condition Information Label | 30 |
| SECTIO | N 7 - OPERATING WELDING GENERATOR - CC/CV MODELS | 32 |
| 7-1. | Front Panel Controls For CC/CV Models (See Section 7-2) | 32 |
| 7-2. | Description Of Front Panel Controls For CC/CV Models (See Section 7-1) | 33 |
| 7.0 | Process (Contactor Switch On CC/CV Models | 24 |

TABLE OF CONTENTS

| 7-4. Remote Voltage/Amperage Control On CC/CV Models (Optional) | 35 |
|-----------------------------------------------------------------------|------------|
| 7-5. Fuel/Hour Gauge Descriptions | 36 |
| SECTION 8 - OPERATING AUXILIARY EQUIPMENT | 7 |
| 8-1. Domestic Auxiliary Power Receptacles | 37 |
| 8-2. Connecting To Optional Three-Phase Generator (CC/CV Models Only) | 8 |
| | 39 |
| SECTION 9 - MAINTENANCE & TROUBLESHOOTING 4 | Ю |
| 9-1. Maintenance Label | Ю |
| 9-2. Routine Maintenance | 1 |
| 9-3. Servicing Air Cleaner | 12 |
| 9-4. Inspecting And Cleaning Optional Spark Arrestor Muffler | 3 |
| 9-5. Checking Generator Brushes | ŀЗ |
| 9-6. Servicing Fuel And Lubrication Systems | 14 |
| 9-7. Overload Protection 4 | ŀ5 |
| 9-8. Troubleshooting | ŀ6 |
| SECTION 10 - ELECTRICAL DIAGRAMS | 50 |
| SECTION 11 – RUN-IN PROCEDURE 5 | 54 |
| 11-1. Wetstacking | 54 |
| 11-2. Run-In Procedure Using Load Bank | 55 |
| 11-3. Run-In Procedure Using Resistance Grid | 6 |
| SECTION 12 – GENERATOR POWER GUIDELINES | 7 |
| SECTION 13 - PARTS LIST 6 | j 4 |
| OPTIONS AND ACCESSORIES | |
| WARRANTY | |

SECTION 1 - SAFETY PRECAUTIONS - READ BEFORE USING



Protect yourself and others from injury — read and follow these precautions.

1-1. Symbol Usage



DANGER! - Indicates a hazardous situation which, if not avoided, will result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.



Indicates a hazardous situation which, if not avoided, could result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

NOTICE - Indicates statements not related to personal injury.

[Indicates special instructions.



This group of symbols means Warning! Watch Out! ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the

1-2. Arc Welding Hazards



The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-7. Read and follow all Safety Standards.



Only qualified persons should install, operate, maintain, and repair this unit.



During operation, keep everybody, especially children, away.



ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input

power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- . Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on
- · Additional safety precautions are required when any of the following electrically hazardous conditions are present: in damp locations or while wearing wet clothing; on metal structures such as floors, gratings, or scaffolds; when in cramped positions such as sitting, kneeling, or lying; or when there is a high risk of unavoidable or accidental contact with the workpiece or ground. For these conditions, use the following equipment in order presented: 1) a semiautomatic DC constant voltage (wire) welder, 2) a DC manual (stick) welder, or 3) an AC welder with reduced open-circuit voltage. In most situations, use of a DC, constant voltage wire welder is recommended. And, do not work alone!
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.

- Always verify the supply ground check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first - double-check connections.
- Keep cords dry, free of oil and grease, and protected from hot metal and sparks.
- Frequently inspect input power cord for damage or bare wiring replace cord immediately if damaged — bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Do not touch electrode holders connected to two welding machines at the same time since double open-circuit voltage will be
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal.

SIGNIFICANT DC VOLTAGE exists in inverters after stopping engine.

Stop engine on inverter and discharge input capacitors according to instructions in Maintenance Section before touching any parts.



HOT PARTS can cause severe burns.

- Do not touch hot parts bare handed.
- Allow cooling period before working on equip-
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.



FLYING METAL or DIRT can injure eyes.

- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.

FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use local forced ventilation at the arc to remove welding fumes and gases.
- If ventilation is poor, wear an approved air-supplied respirator.
- Read and understand the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while
 wearing an air-supplied respirator. Always have a trained watchperson nearby. Welding fumes and gases can displace air and
 lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.



BUILDUP OF GAS can injure or kill.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.



ARC RAYS can burn eyes and skin.

Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear an approved welding helmet fitted with a proper shade of filter lenses to protect your face and eyes from arc rays and sparks when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet
- Use protective screens or barriers to protect others from flash, glare, and sparks; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather, heavy cotton, or wool) and foot protection.



WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece,

and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Do not weld where flying sparks can strike flammable material.
- Protect yourself and others from flying sparks and hot metal.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.

- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Do not weld where the atmosphere may contain flammable dust, gas, or liquid vapors (such as gasoline).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock, sparks, and fire hazards
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.
- After completion of work, inspect area to ensure it is free of sparks, glowing embers, and flames.
- Use only correct fuses or circuit breakers. Do not oversize or bypass them.
- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.



NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

 Wear approved ear protection if noise level is high.



MAGNETIC FIELDS can affect Implanted Medical Devices.

- Wearers of Pacemakers and other Implanted Medical Devices should keep away.
- Implanted Medical Device wearers should consult their doctor and the device manufacturer before going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations.



CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Use the right equipment, correct procedures, and sufficient number of persons to lift and move cylinders.
- Read and follow instructions on compressed gas cylinders, associated equipment, and Compressed Gas Association (CGA) publication P-1 listed in Safety Standards.

1-3. Engine Hazards



BATTERY EXPLOSION can BLIND.

- Always wear a face shield, rubber gloves, and protective clothing when working on a battery.
- Stop engine before disconnecting or connecting battery cables or servicing battery.
- Do not allow tools to cause sparks when working on a battery.
- Do not use welder to charge batteries or jump start vehicles.
- Observe correct polarity (+ and -) on batteries.
- Disconnect negative (-) cable first and connect it last.



FUEL can cause fire or explosion.

- Stop engine and let it cool off before checking or adding fuel.
- Do not add fuel while smoking or if unit is near any sparks or open flames.
- Do not overfill tank allow room for fuel to expand.
- Do not spill fuel. If fuel is spilled, clean up before starting engine.
- · Dispose of rags in a fireproof container.
- · Always keep nozzle in contact with tank when fueling.



MOVING PARTS can cause injury.

- Keep away from fans, belts, and rotors.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Stop engine before installing or connecting unit.
- Have only qualified people remove doors, panels, covers, or guards for maintenance and troubleshooting as necessary.
- To prevent accidental starting during servicing, disconnect negative (-) battery cable from battery.
- Keep hands, hair, loose clothing, and tools away from moving parts.
- Reinstall doors, panels, covers, or guards when servicing is finished and before starting engine.
- Before working on generator, remove spark plugs or injectors to keep engine from kicking back or starting.
- Block flywheel so that it will not turn while working on generator components.



HOT PARTS can cause severe burns.

- Do not touch hot parts bare handed.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.



STEAM AND HOT COOLANT can burn.

- If possible, check coolant level when engine is cold to avoid scalding.
- Always check coolant level at overflow tank, if present on unit, instead of radiator (unless told otherwise in maintenance section or engine manual).
- If the engine is warm, checking is needed, and there is no overflow tank, follow the next two statements.
- Wear safety glasses and gloves and put a rag over radiator cap.
- Turn cap slightly and let pressure escape slowly before completely removing cap.



Using a generator indoors CAN KILL YOU IN MINUTES.

- Generator exhaust contains carbon monoxide.
 This is a poison you cannot see or smell.
- NEVER use inside a home or garage, EVEN IF doors and windows are open.
- Only use OUTSIDE and far away from windows, doors, and vents.



BATTERY ACID can BURN SKIN and EYES.

- Do not tip battery.
- Replace damaged battery.
- Flush eyes and skin immediately with water.



ENGINE HEAT can cause fire.

- Do not locate unit on, over, or near combustible surfaces or flammables.
- Keep exhaust and exhaust pipes way from flammables.



EXHAUST SPARKS can cause fire.

- Do not let engine exhaust sparks cause fire.
- Use approved engine exhaust spark arrestor in required areas — see applicable codes.





BREATHING COMPRESSED AIR can cause serious injury or death.

- Do not use compressed air for breathing.
- Use only for cutting, gouging, and tools.



COMPRESSED AIR can cause injury.

- Wear approved safety goggles.
- Do not direct air stream toward self or others.



TRAPPED AIR PRESSURE AND WHIPPING HOSES can cause injury.

 Release air pressure from tools and system before servicing, adding or changing attachments, or opening compressor oil drain or oil fill can



HOT METAL from air arc cutting and gouging can cause fire or explosion.

- Do not cut or gouge near flammables.
- Watch for fire; keep extinguisher nearby.



HOT PARTS can cause burns and injury.

- Do not touch hot compressor or air system parts.
- Let system cool down before touching or servicing.



READ INSTRUCTIONS.

- Read Owner's Manual before using or servicing unit.
- Stop engine and release air pressure before servicing.
- Use only genuine replacement parts from the manufacturer.

1-5. Additional Symbols For Installation, Operation, And Maintenance



FIRE OR EXPLOSION hazard.

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring be sure power supply system is properly sized, rated, and protected to handle this unit.



FALLING UNIT can cause injury.

- Use lifting eye to lift unit and properly installed accessories only, NOT gas cylinders. Do not exceed maximum lift eye weight rating (see Specifications).
- Lift and support unit only with proper equipment and correct procedures.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



OVERHEATING can damage motors.

- Turn off or unplug equipment before starting or stopping engine.
- Do not let low voltage and frequency caused by low engine speed damage electric motors.
- Do not connect 50 or 60 Hertz motors to the 100 Hertz receptacle where applicable.



FLYING SPARKS can cause injury.

- Wear a face shield to protect eyes and face.
- Shape tungsten electrode only on grinder with proper guards in a safe location wearing proper face, hand, and body protection.
- Sparks can cause fires keep flammables away.



MOVING PARTS can cause injury.

- · Keep away from moving parts.
- Keep away from pinch points such as drive rolls.



WELDING WIRE can cause injury.

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.



OVERUSE can cause **OVERHEATING**.

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.



STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.



TILTING OF TRAILER can cause injury.

- Use tongue jack or blocks to support weight.
- Properly install welding generator onto trailer according to instructions supplied with trailer.



READ INSTRUCTIONS.

- Read Owner's Manual before using or servicing unit.
- Use only genuine replacement parts from the manufacturer.
- Perform engine and air compressor maintenance and service according to this manual and the engine/air compressor (if applicable) manuals.



H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.



ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as microprocessors, computers, and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

1-6. California Proposition 65 Warnings



Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer, (California Health & Safety Code Section 25249.5 et seq.)



 Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

For Gasoline Engines:



Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

For Diesel Engines:



Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

1-7. **Principal Safety Standards**

Safety in Welding, Cutting, and Allied Processes, ANSI Standard Z49.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping, American Welding Society Standard AWS F4.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, P.O. Box 9101, Quincy, MA 02269-9101 (phone: 617-770-3000, website: www.nfpa.org and www. sparky.org).

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, VA 20151 (phone: 703-788-2700, website:www.cganet.com).

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 5060 Mississauga,

Ontario, Canada L4W 5NS (phone: 800-463-6727 or in Toronto 416-747-4044, website: www.csa-international.org).

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002 (phone: 212-642-4900, website: www.ansi.org).

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B, from National Fire Protection Association, P.O. Box 9101, Quincy, MA 02269-9101 (phone: 617-770-3000, website: www.nfpa.org.

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 (phone: 1-866-512-1800) (there are 10 Regional Offices-phone for Region 5, Chicago, is 312-353-2220, website: www.osha.gov).

1-8. EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

Welding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: "The body of evidence, in the committee's judgment, has not demonstrated that exposure to powerfrequency electric and magnetic fields is a human-health hazard." However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

- 1. Keep cables close together by twisting or taping them, or using a cable cover.
- 2. Arrange cables to one side and away from the operator.
- 3. Do not coil or drape cables around your body.
- 4. Keep welding power source and cables as far away from operator as practical.
- 5. Connect work clamp to workpiece as close to the weld as possible.

About Implanted Medical Devices:

Implanted Medical Device wearers should consult their doctor and the device manufacturer before performing or going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations. If cleared by your doctor, then following the above procedures is recom-

SECTION 2 - CONSIGNES DE SÉCURITÉ - LIRE AVANT **UTILISATION**

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A Se protéger, ainsi que toute autre personne travaillant sur les lieux, contre les étincelles et le métal chaud.

Signification des symboles



DANGER! - Indique une situation dangereuse qui si on l'évite pas peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.



Indique une situation dangereuse qui si on l'évite pas peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.

NOTE - Indique des déclarations pas en relation avec des blessures personnelles.

Indique des instructions spécifiques.









Ce groupe de symboles veut dire Avertissement! Attention! DANGER DE CHOC ELECTRIQUE, PIECES EN MOUVEMENT, et PIECES CHAUDES. Consulter les symboles et les instructions ci-dessous v afférant pour les actions nécessaires afin d'éviter le danger.

2-2. Dangers relatifs au soudage à l'arc



Les symboles présentés ci-après sont utilisés tout au long du présent manuel pour attirer votre attention et identifier les risques de danger. Lorsque vous vovez un symbole, sovez vigilant et suivez les directives mentionnées afin d'éviter tout danger. Les consignes de sécurité présentées ci-après ne font que résumer l'information contenue dans les normes de sécurité énumérées à la section 2-7. Veuillez lire et respecter toutes ces normes de sécurité.



L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées.



Au cours de l'utilisation, tenir toute personne à l'écart et plus particulièrement les enfants.



UN CHOC ÉLECTRIQUE peut tuer.

Un simple contact avec des pièces électriques peut provoquer une électrocution ou des blessures graves. L'électrode et le circuit de soudage sont sous tension

dès que l'appareil est sur ON. Le circuit d'entrée et les circuits internes de l'appareil sont également sous tension à ce moment-là. En soudage semi-automatique ou automatique, le fil, le dévidoir, le logement des galets d'entraînement et les pièces métalliques en contact avec le fil de soudage sont sous tension. Des matériels mal installés ou mal mis à la terre présentent un danger.

- Ne jamais toucher les pièces électriques sous tension.
- Porter des gants et des vêtements de protection secs ne comportant pas de trous.
- S'isoler de la pièce et de la terre au moyen de tapis ou d'autres moyens isolants suffisamment grands pour empêcher le contact physique éventuel avec la pièce ou la terre.
- Ne pas se servir de source électrique à courant électrique dans les zones humides, dans les endroits confinés ou là où on risque de
- Se servir d'une source électrique à courant électrique UNIQUE-MENT si le procédé de soudage le demande.
- Si l'utilisation d'une source électrique à courant électrique s'avère nécessaire, se servir de la fonction de télécommande si l'appareil en est équipé.
- Des précautions de sécurité supplémentaires sont requises dans des environnements à risque comme: les endroits humides ou lorsque l'on porte des vêtements mouillés; sur des structures métalliques au sol, grillages et échafaudages; dans des positions assises, à genoux et allongées; ou quand il y a un risque important de contact accidentel avec la pièce ou le sol. Dans ces cas utiliser les appareils suivants dans l'ordre de préférence: 1) un poste à souder DC semi-automatique de type CV (MIG/MAG), 2) un poste à souder manuel (électrode enrobée) DC, 3) un poste à souder

- manuel AC avec tension à vide réduite. Dans la plupart des cas, un poste courant continu de type CV est recommandé. Et, ne pas travailler seul!
- Couper l'alimentation ou arrêter le moteur avant de procéder à l'installation, à la réparation ou à l'entretien de l'appareil. Déverrouiller l'alimentation selon la norme OSHA 29 CFR 1910.147 (voir normes de sécurité).
- Installer et mettre à la terre correctement cet appareil conformément à son manuel d'utilisation et aux codes nationaux, provinciaux et municipaux.
- Toujours vérifier la terre du cordon d'alimentation Vérifier et s'assurer que le fil de terre du cordon d'alimentation est bien raccordé à la borne de terre du sectionneur ou que la fiche du cordon est raccordée à une prise correctement mise à la terre.
- En effectuant les raccordements d'entrée fixer d'abord le conducteur de mise à la terre approprié et contre-vérifier les connexions.
- Les câbles doivent être exempts d'humidité, d'huile et de graisse; protégez-les contre les étincelles et les pièces métalliques chau-
- Vérifier fréquemment le cordon d'alimentation pour voir s'il n'est pas endommagé ou dénudé - remplacer le cordon immédiatement s'il est endommagé – un câble dénudé peut provoquer une électro-
- Mettre l'appareil hors tension quand on ne l'utilise pas.
- Ne pas utiliser des câbles usés, endommagés, de grosseur insuffisante ou mal épissés.
- Ne pas enrouler les câbles autour du corps.
- Si la pièce soudée doit être mise à la terre, le faire directement avec un câble distinct - ne pas utiliser le connecteur de pièce ou le câble de retour.
- Ne pas toucher l'électrode quand on est en contact avec la pièce, la terre ou une électrode provenant d'une autre machine.
- Ne pas toucher des porte électrodes connectés à deux machines en même temps à cause de la présence d'une tension à vide dou-
- N'utiliser qu'un matériel en bon état. Réparer ou remplacer sur-le-champ les pièces endommagées. Entretenir l'appareil conformément à ce manuel.
- Porter un harnais de sécurité quand on travaille en hauteur.
- Maintenir solidement en place tous les panneaux et capots.
- Fixer le câble de retour de façon à obtenir un bon contact métalmétal avec la pièce à souder ou la table de travail, le plus près possible de la soudure.
- Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.

Une tension DC importante subsiste à l'intérieur des onduleurs après avoir coupé l'alimentation.

Couper l'alimentation du poste et décharger les condensateurs d'entrée comme indiqué dans la Section Maintenance avant de toucher des composants.



DES PIÈCES CHAUDES peuvent provoquer des brûlures graves.

- Ne pas toucher à mains nues les parties chaudes.
- Prévoir une période de refroidissement avant de travailler à l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.



DES PIECES DE METAL ou DES SALETES peuvent provoquer des blessures dans les yeux.

- Le soudage, l'écaillement, le passage de la pièce à la brosse en fil de fer, et le meulage génèrent des étincelles et des particules métalliques volantes. Pendant la période de refroidissement des soudures, elles risquent de projeter du laitier.
- Porter des lunettes de sécurité avec écrans latéraux ou un écran facial.



LES FUMÉES ET LES GAZ peuvent être dangereux.

Le soudage génère des fumées et des gaz. Leur inhalation peut être dangereux pour votre santé.

- Eloigner votre tête des fumées. Ne pas respirer les fumées.
- À l'intérieur, ventiler la zone et/ou utiliser une ventilation forcée au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage.
- Si la ventilation est médiocre, porter un respirateur anti-vapeurs approuvé.
- Lire et comprendre les spécifications de sécurité des matériaux (MSDS) et les instructions du fabricant concernant les métaux, les consommables, les revêtements, les nettoyants et les dégraisseurs.
- Travailler dans un espace fermé seulement s'il est bien ventilé ou en portant un respirateur à alimentation d'air. Demander toujours à un surveillant dûment formé de se tenir à proximité. Des fumées et des gaz de soudage peuvent déplacer l'air et abaisser le niveau d'oxygène provoquant des blessures ou des accidents mortels. S'assurer que l'air de respiration ne présente aucun danger.
- Ne pas souder dans des endroits situés à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir en présence de vapeurs et former des gaz hautement toxiques et irritants.
- Ne pas souder des métaux munis d'un revêtement, tels que l'acier galvanisé, plaqué en plomb ou au cadmium à moins que le revêtement n'ait été enlevé dans la zone de soudure, que l'endroit soit bien ventilé, et en portant un respirateur à alimentation d'air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques en cas de soudage.



LES ACCUMULATIONS DE GAZ risquent de provoquer des blessures ou même la mort.

- Fermer l'alimentation du gaz protecteur en cas de non utilisation.
- Veiller toujours à bien aérer les espaces confinés ou se servir d'un respirateur d'adduction d'air homologué.



LES RAYONS DE L'ARC peuvent provoquer des brûlures dans les yeux et sur la peau.

Le rayonnement de l'arc du procédé de soudage génère des rayons visibles et invisibles intenses

(ultraviolets et infrarouges) susceptibles de provoquer des brûlures dans les yeux et sur la peau. Des étincelles sont projetées pendant le soudage.

- Porter un casque de soudage approuvé muni de verres filtrants approprié pour protéger visage et yeux pendant le soudage (voir ANSI Z49.1 et Z87.1 énuméré dans les normes de sécurité).
- Porter des lunettes de sécurité avec écrans latéraux même sous votre casque.
- Avoir recours à des écrans protecteurs ou à des rideaux pour protéger les autres contre les rayonnements les éblouissements et les étincelles; prévenir toute personne sur les lieux de ne pas regarder l'arc.
- Porter des vêtements confectionnés avec des matières résistantes et ignifuges (cuir, coton lourd ou laine) et des bottes de protection.



LE SOUDAGE peut provoquer un incendie ou une explosion.

Le soudage effectué sur des conteneurs fermés tels que des réservoirs, tambours ou des conduites peut provoquer leur éclatement. Des étincelles peuvent

être projetées de l'arc de soudure. La projection d'étincelles, des pièces chaudes et des équipements chauds peut provoquer des incendies et des brûlures. Le contact accidentel de l'électrode avec des objets métalliques peut provoquer des étincelles, une explosion, un surchauffement ou un incendie. Avant de commencer le soudage, vérifier et s'assurer que l'endroit ne présente pas de danger.

- Déplacer toutes les substances inflammables à une distance de 10,7 m de l'arc de soudage. En cas d'impossibilité les recouvrir soigneusement avec des protections homologués.
- Ne pas souder dans un endroit là où des étincelles peuvent tomber sur des substances inflammables.
- Se protéger et d'autres personnes de la projection d'étincelles et de métal chaud.
- Des étincelles et des matériaux chauds du soudage peuvent facilement passer dans d'autres zones en traversant de petites fissures et des ouvertures.
- Surveiller tout déclenchement d'incendie et tenir un extincteur à proximité.
- Le soudage effectué sur un plafond, plancher, paroi ou séparation peut déclencher un incendie de l'autre côté.
- Ne pas effectuer le soudage sur des conteneurs fermés tels que des réservoirs, tambours, ou conduites, à moins qu'ils n'aient été préparés correctement conformément à AWS F4.1 (voir les normes de sécurité).
- Ne soudez pas si l'air ambiant est chargé de particules, gaz, ou vapeurs inflammables (vapeur d'essence, par exemple).
- Brancher le câble de masse sur la pièce le plus près possible de la zone de soudage pour éviter le transport du courant sur une longue distance par des chemins inconnus éventuels en provoquant des risques d'électrocution, d'étincelles et d'incendie.
- Ne pas utiliser le poste de soudage pour dégeler des conduites gelées.
- En cas de non utilisation, enlever la baguette d'électrode du porteélectrode ou couper le fil à la pointe de contact.
- Porter des vêtements de protection dépourvus d'huile tels que des gants en cuir, une chemise en matériau lourd, des pantalons sans revers, des chaussures hautes et un couvre chef.
- Avant de souder, retirer toute substance combustible de vos poches telles qu'un allumeur au butane ou des allumettes.
- Une fois le travail achevé, assurez-vous qu'il ne reste aucune trace d'étincelles incandescentes ni de flammes.
- Utiliser exclusivement des fusibles ou coupe-circuits appropriés.
 Ne pas augmenter leur puissance; ne pas les ponter.
- Suivre les recommandations dans OSHA 1910.252(a) (2) (iv) et NFPA 51B pour les travaux à chaud et avoir de la surveillance et un extincteur à proximité.



LE BRUIT peut affecter l'ouïe.

Le bruit des processus et des équipements peut affecter l'ouïe.

Porter des protections approuvés pour les oreilles si le niveau sonore est trop élevé.



LES CHAMPS MAGNETIQUES peuvent affecter des implants médicaux.

- Porteur de simulateur cardiaque ou autre implants médicaux, rester à distance.
- Les porteurs d'implants doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de soudage par points, de gougeage, du coupage plasma ou de chauffage par induction.



Si des BOUTEILLES sont endommagées, elles pourront exploser.

Des bouteilles de gaz protecteur contiennent du gaz sous haute pression. Si une bouteille est endomma-

gée, elle peut exploser. Du fait que les bouteilles de gaz font normalement partie du procédé de soudage, les manipuler avec précaution.

 Protéger les bouteilles de gaz comprimé d'une chaleur excessive, des chocs mécaniques, des dommages physiques, du laitier, des flammes ouvertes, des étincelles et des arcs.

- Placer les bouteilles debout en les fixant dans un support stationnaire ou dans un porte-bouteilles pour les empêcher de tomber ou de se renverser.
- Tenir les bouteilles éloignées des circuits de soudage ou autres circuits électriques.
- Ne jamais placer une torche de soudage sur une bouteille à gaz.
- Une électrode de soudage ne doit jamais entrer en contact avec une bouteille.
- Ne jamais souder une bouteille pressurisée risque d'explosion.
- Utiliser seulement des bouteilles de gaz protecteur, régulateurs, tuyaux et raccords convenables pour cette application spécifique; les maintenir ainsi que les éléments associés en bon état.
- Ne pas tenir la tête en face de la sortie en ouvrant la soupape de la bouteille.
- Maintenir le chapeau de protection sur la soupape, sauf en cas d'utilisation ou de branchement de la bouteille.
- Utiliser les équipements corrects, les bonnes procédures et suffisamment de personnes pour soulever et déplacer les bouteilles.
- Lire et suivre les instructions sur les bouteilles de gaz comprimé, l'équipement connexe et le dépliant P-1 de la CGA (Compressed Gas Association) mentionné dans les principales normes de sécurité.

2-3. Dangers existant en relation avec le moteur



L'EXPLOSION DE LA BATTERIE peut RENDRE AVEUGLE.

- Toujours porter une protection faciale, des gants en caoutchouc et vêtements de protection lors d'une intervention sur la batterie.
- Arrêter le moteur avant de débrancher ou de brancher les câbles de batterie.
- Eviter de provoquer des étincelles avec les outils en travaillant sur la batterie.
- Ne pas utiliser le poste de soudage pour charger les batteries ou des véhicules de démarrage rapide.
- Observer la polarité correcte (+ et -) sur les batteries.
- Débrancher le câble négatif (–) en premier lieu. Le rebrancher en dernier lieu.



LE CARBURANT MOTEUR peut provoquer un incendie ou une explosion.

- Arrêter le moteur avant de vérifier le niveau de carburant ou de faire le plein.
- Ne pas faire le plein en fumant ou proche d'une source d'étincelles ou d'une flamme nue.
- Ne pas faire le plein de carburant à ras bord; prévoir de l'espace pour son expansion.
- Faire attention de ne pas renverser de carburant. Nettoyer tout carburant renversé avant de faire démarrer le moteur.
- Jeter les chiffons dans un récipient ignifuge.
- Toujours garder le pistolet en contact avec le réservoir lors du remplissage.



DES ORGANES MOBILES peuvent provoquer des blessures.

- Ne pas approcher les mains des ventilateurs, courroies et autres pièces en mouvement.
- Maintenir fermés et fixement en place les portes, panneaux, recouvrements et dispositifs de protection.
- Arrêter le moteur avant d'installer ou brancher l'appareil.

- Seules des personnes qualifiées sont autorisées à enlever les portes, panneaux, recouvrements ou dispositifs de protection pour effectuer, s'il y a lieu, des travaux d'entretien et de dépannage.
- Pour empêcher tout démarrage accidentel pendant les travaux d'entretien, débrancher le câble négatif (-) de batterie de la borne.
- Ne pas approcher les mains, cheveux, vêtements lâches et outils des organes mobiles.
- Remettre en place les panneaux ou les dispositifs de protection et fermer les portes à la fin des travaux d'entretien et avant de faire démarrer le moteur.
- Avant d'intervenir, déposer les bougies ou injecteurs pour éviter la mise en route accidentelle du moteur.
- Bloquer le volant moteur pour éviter sa rotation lors d'une intervention sur le générateur.



DES PIÈCES CHAUDES peuvent provoquer des brûlures graves.

- Ne pas toucher à mains nues les parties chaudes.
- Prévoir une période de refroidissement avant de travailler à l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.



LA VAPEUR ET LE LIQUIDE DE REFROIDISSEMENT CHAUD peuvent provoquer des brûlures.

- Il est préférable de vérifier le liquide de refroidissement une fois le moteur refroidi pour éviter de se brûler.
- Toujours vérifier le niveau de liquide de refroidissement dans le vase d'expansion (si présent), et non dans le radiateur (sauf si précisé autrement dans la section maintenance du manuel du moteur).
- Si le moteur est chaud et que le liquide doit être vérifié, opérer comme suivant.
- Mettre des lunettes de sécurité et des gants, placer un torchon sur le bouchon du radiateur.
- Dévisser le bouchon légèrement et laisser la vapeur s'échapper avant d'enlever le bouchon.



L'utilisation d'un groupe autonome à l'intérieur PEUT VOUS TUER EN QUELQUES MINUTES.

- Les fumées d'un groupe autonome contient du monoxyde de carbone. C'est un poison invisi-
- JAMAIS utiliser dans une maison ou garage. même avec les portes et fenêtres ouvertes.
- Uniquement utiliser à l'EXTERIEUR, loin des portes, fenêtres et bouches aération.



L'ACIDE DE LA BATTERIE peut provoquer des brûlures dans les YEUX et sur la PEAU.

- Ne pas renverser la batterie.
- Remplacer une batterie endommagée.
- Rincer immédiatement les yeux et la peau à l'eau.



LA CHALEUR DU MOTEUR peut provoquer un incendie.

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces inflammables.
- Tenir à distance les produits inflammables de l'échappement.



LES ÉTINCELLES À L'ÉCHAPPEMENT peuvent provoquer un incendie.

- Empêcher les étincelles d'échappement du moteur de provoquer un incendie.
- Utiliser uniquement un pare-étincelles approuvé - voir codes en vigueur.

Dangers liés à l'air comprimé



RESPIRER L'AIR COMPRIMÉ peut provoquer des blessures graves ou causer la mort.

- Ne pas utiliser l'air comprimé pour respirer.
- Utiliser l'air comprimé seulement pour le coupage, gougeage et les outils pneumatiques.



L'AIR COMPRIMÉ peut provoquer des blessures.

- Porter des lunettes de sécurité approuvées.
- Ne pas diriger le jet d'air vers d'autres ou soi-même.



L'AIR COMPRIME EMMAGASINE ET DES **TUYAUX SOUS PRESSION peuvent provo**quer des blessures.

Relâcher la pression d'air de l'outillage ou du système avant d'effectuer la maintenance, avant de changer ou de rajouter des éléments ou avant d'ouvrir la purge ou le bouchon de remplissage d'huile.



Le METAL CHAUD lors du coupage et gougeage plasma peut provoquer un incendie ou une explosion.

- Ne pas couper ou gouger à proximité de produits inflammables.
- Surveillez et garder un extincteur à proximité.



DES PIECES CHAUDES peuvent provoquer des brûlures et blessures.

- Ne pas toucher le compresseur ou d'autres éléments du circuit air comprimé chauds.
- Laisser l'ensemble se refroidir avant de toucher ou d'effectuer la maintenance.



LIRE LES INSTRUCTIONS.

- Lisez le manuel d'instructions avant l'utilisation ou la maintenance de l'appareil.
- Arrêter le moteur et relâcher la pression avant d'effectuer la maintenance.
- N'utiliser que les pièces de rechange recommandées par le constructeur.

2-5. Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance



Risque D'INCENDIE OU D'EXPLO-SION.

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces inflammables.
- Ne pas installer l'appareil à proximité de produits inflammables.
- Ne pas surcharger l'installation électrique s'assurer que l'alimentation est correctement dimensionnée et protégée avant de mettre l'appareil en service.



LA CHUTE DE L'APPAREIL peut blesser.

- Utiliser l'anneau de levage pour lever l'appareil et les accessoires correctement installées seuls, PAS les bouteilles de gaz. Ne pas dépasser le poids nominal maximal de l'œilleton (voir les spécifications).
- Ne lever et ne soutenir l'appareil qu'avec de l'équipement approprié et en suivant les procédures adéquates.
- En utilisant des fourches de levage pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.





LE SURCHAUFFEMENT peut endommager le moteur électrique.

- Arrêter ou déconnecter l'équipement avant de démarrer ou d'arrêter le moteur.
- Ne pas laisser tourner le moteur trop lentement sous risque d'endommager le moteur électrique à cause d'une tension et d'une fréquence trop faibles.
- Ne pas brancher de moteur de 50 ou de 60 Hz à la prise de 100 Hz, s'il y a lieu.



LES ÉTINCELLES VOLANTES risquent de provoquer des blessures.

- Porter un écran facial pour protéger le visage et les yeux.
- Affûter l'électrode au tungstène uniquement à la meuleuse dotée de protecteurs. Cette manœuvre est à exécuter dans un endroit sûr lorsque l'on porte l'équipement homologué de protection du visage, des mains et du corps.
- Les étincelles risquent de causer un incendie éloigner toute substance inflammable.



DES ORGANES MOBILES peuvent provoquer des blessures.

- Ne pas s'approcher des organes mobiles.
- Ne pas s'approcher des points de coincement tels que des rouleaux de commande.



LES FILS DE SOUDAGE peuvent provoquer des blessures.

- Ne pas appuyer sur la gâchette avant d'en avoir reçu l'instruction.
- Ne pas diriger le pistolet vers soi, d'autres personnes ou toute pièce mécanique en engageant le fil de soudage.



L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

- Laisser l'équipement refroidir ; respecter le facteur de marche nominal.
- Réduire le courant ou le facteur de marche avant de poursuivre le soudage.
- Ne pas obstruer les passages d'air du poste.



LES CHARGES ÉLECTROSTATI-QUES peuvent endommager les circuits imprimés.

- Établir la connexion avec la barrette de terre avant de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes de circuits imprimes.



UNE REMORQUE QUI BASCULE peut entraîner des blessures.

- Utiliser les supports de la remorque ou des blocs pour soutenir le poids.
- Installer convenablement le poste sur la remorque comme indiqué dans le manuel s'y rapportant



LIRE LES INSTRUCTIONS.

- Lisez le manuel d'instructions avant l'utilisation ou la maintenance de l'appareil.
- N'utiliser que les pièces de rechange recommandées par le constructeur.
- Effectuer la maintenance et le service du moteur et du compresseur d'air suivant les instructions dans ce manuel ou le manuel du moteur/compresseur (si applicable).



LE RAYONNEMENT HAUTE FRÉ-QUENCE (H.F.) risque de provoquer des interférences.

- Le rayonnement haute fréquence (H.F.) peut provoquer des interférences avec les équipements de radio-navigation et de communication, les services de sécurité et les ordinateurs.
- Demander seulement à des personnes qualifiées familiarisées avec des équipements électroniques de faire fonctionner l'installation.
- L'utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences résultant de l'installation.
- Si le FCC signale des interférences, arrêter immédiatement l'appareil.
- Effectuer régulièrement le contrôle et l'entretien de l'installation.
- Maintenir soigneusement fermés les portes et les panneaux des sources de haute fréquence, maintenir les éclateurs à une distance correcte et utiliser une terre et un blindage pour réduire les interférences éventuelles.



LE SOUDAGE À L'ARC risque de provoquer des interférences.

- L'énergie électromagnétique risque de provoquer des interférences pour l'équipement électronique sensible tel que les ordinateurs et l'équipement commandé par ordinateur tel que les robots.
- Veiller à ce que tout l'équipement de la zone de soudage soit compatible électromagnétiquement.
- Pour réduire la possibilité d'interférence, maintenir les câbles de soudage aussi courts que possible, les grouper, et les poser aussi bas que possible (ex. par terre).
- Veiller à souder à une distance de 100 mètres de tout équipement électronique sensible.
- Veiller à ce que ce poste de soudage soit posé et mis à la terre conformément à ce mode d'emploi.
- En cas d'interférences après avoir pris les mesures précédentes, il incombe à l'utilisateur de prendre des mesures supplémentaires telles que le déplacement du poste, l'utilisation de câbles blindés, l'utilisation de filtres de ligne ou la pose de protecteurs dans la zone de travail.

2-6. **Proposition californienne 65 Avertissements**



Les équipements de soudage et de coupage produisent des fumées et des gaz qui contiennent des produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des malformations congénitales et, dans certains cas, des cancers. (Code de santé et de sécurité de Californie, chapitre 25249.5



Les batteries, les bornes et autres accessoires contiennent du plomb et des composés à base de plomb, produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des cancers et des malformations congénitales ou autres problèmes de procréation. Se laver les mains après manipulation.

Pour les moteurs à essence :



Les gaz d'échappement des moteurs contiennent des produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des cancers et des malformations congénitales ou autres problèmes de procréation.

Pour les moteurs diesel :



Les gaz d'échappement des moteurs diesel et certains de leurs composants sont reconnus par l'État de Californie comme provoquant des cancers et des malformations congénitales ou autres problèmes de procréation.

2-7. Principales normes de sécurité

Safety in Welding, Cutting, and Allied Processes, ANSI Standard Z49.1, de Global Engineering Documents (téléphone : 1-877-413-5184, site Internet: www.global.ihs.com).

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping, American Welding Society Standard AWS F4.1 de Global Engineering Documents (téléphone : 1-877-413-5184, site Internet: www.global.ihs.com).

National Electrical Code, NFPA Standard 70, de National Fire Protection Association, P.O. Box 9101, Quincy, MA 02269-9101 (téléphone : 617-770-3000, site Internet: www.nfpa.org).

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, de Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, VA 20151 (téléphone : 703-788-2700, site Internet : www.cganet.com)

Code for Safety in Welding and Cutting, CSA Standard W117.2, de Canadian Standards Association, 5060 Mississauga, Ontario, Canada L4W 5NS (téléphone : 800-463-6727 ou à Toronto 416-747-4044, site Internet: www.csa-international.org).

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, de American National Standards Institute, 11 West 43rd Street, New York, NY 10036-8002 (téléphone : 212-642-4900, site Internet: www.ansi.org).

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B, de National Fire Protection Association, P.O. Box 9101, Quincy, MA 02269-9101 (téléphone : 617-770-3000, site Internet: www.nfpa.org).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, de U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 (téléphone: 1-866-512-1800) (il y a 10 bureaux régionaux--le téléphone de la région 5, Chicago, est 312-353-2220, site Internet : www.osha.gov).

Information EMF

Considérations sur le soudage et les effets de basse fréquence et des champs magnétiques et électriques.

Le courant de soudage, pendant son passage dans les câbles de soudage, causera des champs électromagnétiques. Il y a eu et il y a encore un certain souci à propos de tels champs. Cependant, après avoir examiné plus de 500 études qui ont été faites pendant une période de recherche de 17 ans, un comité spécial ruban bleu du National Research Council a conclu: « L'accumulation de preuves, suivant le jugement du comité, n'a pas démontré que l'exposition aux champs magnétiques et champs électriques à haute fréquence représente un risque à la santé humaine ». Toutefois, des études sont toujours en cours et les preuves continuent à être examinées. En attendant que les conclusions finales de la recherche soient établies, il vous serait souhaitable de réduire votre exposition aux champs électromagnétiques pendant le soudage ou le coupage.

Pour réduire les champs magnétiques sur le poste de travail, appliquer les procédures suivantes :

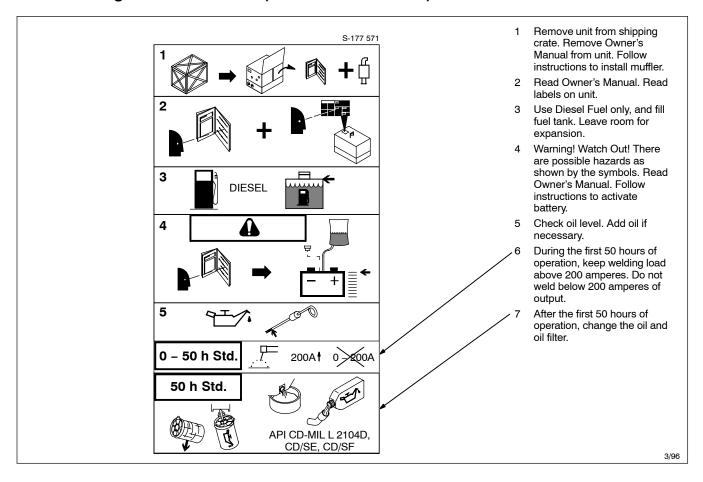
- 1. Garder les câbles ensemble, les torsader, les scotcher, ou les recouvrir d'une housse.
- 2. Disposer les câbles d'un côté et à distance de l'opérateur.
- 3. Ne pas courber pas et ne pas entourer pas les câbles autour de votre corps.
- Garder le poste de soudage et les câbles le plus loin possible de
- 5. Connecter la pince sur la pièce aussi près que possible de la soudure.

En ce qui concerne les implants médicaux :

Les porteurs d'implants doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de soudage par points, de gougeage, du coupage plasma ou de chauffage par induction. Si le médecin approuve, il est recommandé de suivre les procédures précédentes.

SECTION 3 - DEFINITIONS

3-1. Warning Label Definitions (For Wordless Labels)



3-2. Symbols And Definitions

 \square Some symbols are found only on CE products.

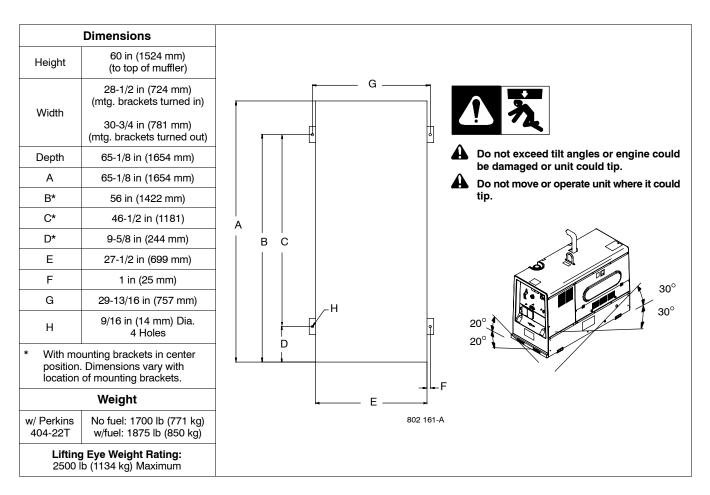
| | Stop Engine | & | Fast (Run, Weld/ Power) | ~ | Slow (Idle) | | Start Engine | |
|----------------|--------------------------|----------------|---------------------------------------------|----------------|---------------------------------------------------------------|----------|--------------------------------|--|
| 88 | Starting Aid | - + | Battery (Engine) | →● ← | Engine Oil Pressure | QT/. | Engine Oil | |
| | Check Injectors/ Pump | | Check Valve Clearance | | Fuel | (F) | Protective Earth (Ground) | |
| + | Positive | | Negative | | Certified/Trained Mechanic | <u></u> | Welding Arc | |
| A | Amperes | V | Volts | | Panel/Local | | Remote | |
| | Engine | | Air Temperature Or Engine Temperature | → | Output | ~ | Alternating Current | |
| <u>.</u> | Stick (SMAW) Welding | 7 | Constant Current (CC) | <u></u> | MIG (GMAW) Welding | <u></u> | TIG (GTAW) | |
| • | Time | h | Hours | S | Seconds | 1~ | Single Phase | |
| 3∕√ | Three Phase | | Read Operator's Manual | 00 | Circuit Protector | <u> </u> | Do Not Switch While Welding | |
| <u></u> | Electrode Connection | ✓ | Work Connection | | Engine-Driven, Three-Phase Alternator With Rectifier | Hz | Hertz | |
| X | Duty Cycle | U _o | Rated No Load Voltage (Average) | U ₂ | Conventional Load Voltage | n | Rated Load Speed | |
| n ₁ | Rated Idle Speed | n _o | Rated No Load Speed | | Current | | Rated Welding Current | |
| | Contactor On | | | | | | | |

SECTION 4 – SPECIFICATIONS

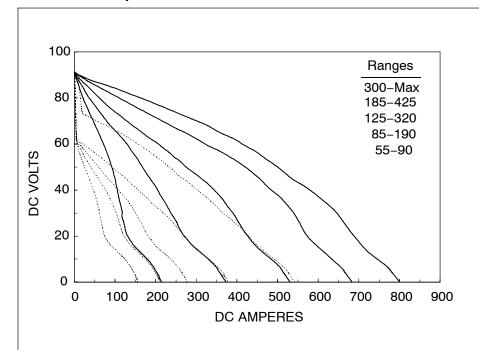
4-1. Weld, Power, And Engine Specifications

| Welding Mode | Weld Output Range | Rated Welding Output | Maximum Open- Circuit Voltage | Generator Power Rating | Engine | Fuel Capacity |
|------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------|
| CC/DC | 65 – 600 A (CC Models) 20 – 600 A (CC/CV Models) | 500 A, 40 Volts DC, 100% Duty Cycle 550 A, 42 Volts DC, | 95 | Standard Single-Phase, 4 kVA/kW, 34/17 A, 120/240 V AC, 50/60 Hz Three-Phase Generator | Perkins Perkins 404D-22T-W Water-Cooled, Four-Cylinder, 47 HP Turbocharged Diesel Engine | 25 gal |
| CV/DC (CC/CV Models Only) | 14 – 40 V | 60% Duty Cycle 600 A, 30 Volts DC (CC), 40% Duty Cycle | 56 | Option* Single-Phase/Three-Phase, 12/20 kVA/kW, 50/48A, 120/240 VAC, 60 Hz *In Addition To Standard 4 kVA/kW Generator Power | | (95 L) |

4-2. Dimensions, Weights, And Operating Angles



4-3. Volt-Ampere Curves For CC Models



The volt-ampere curve shows the minimum and maximum voltage and amperage output capabilities of the welding generator. Curves of all other settings fall between the curves shown.

203 412

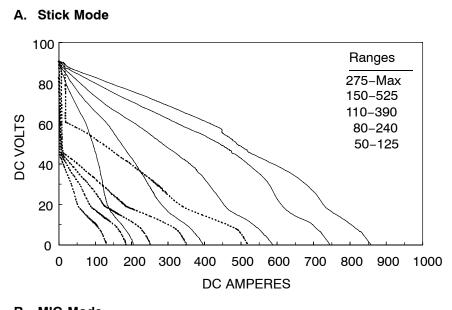
Notes



Work like a Pro!

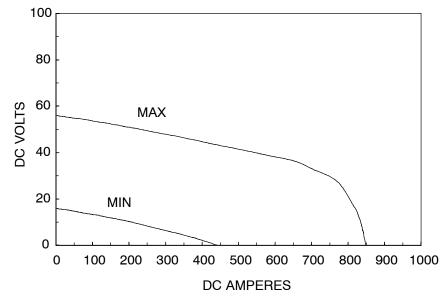
Pros weld and cut safely. Read the safety rules at the beginning of this manual.

4-4. Volt-Ampere Curves For CC/CV Models

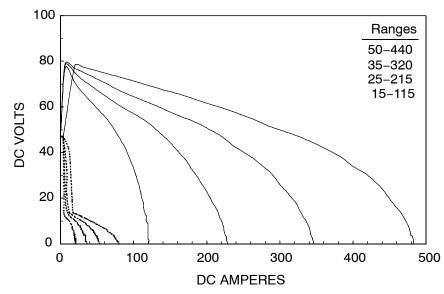


The volt-ampere curves show the minimum and maximum voltage and amperage output capabilities of the welding generator. Curves of all other settings fall between the curves shown.

B. MIG Mode

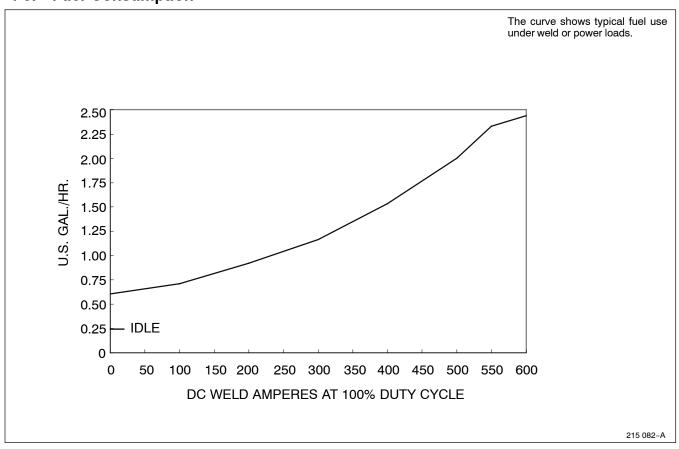


C. TIG Mode

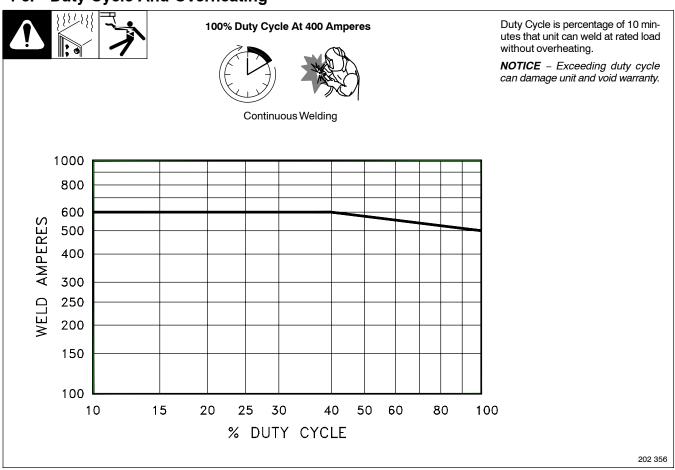


217 811 / 203 415 / 217 810

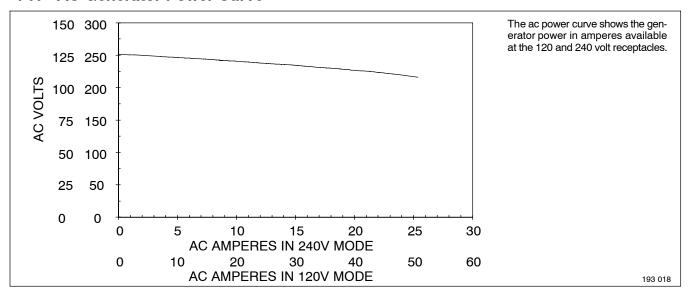
4-5. Fuel Consumption



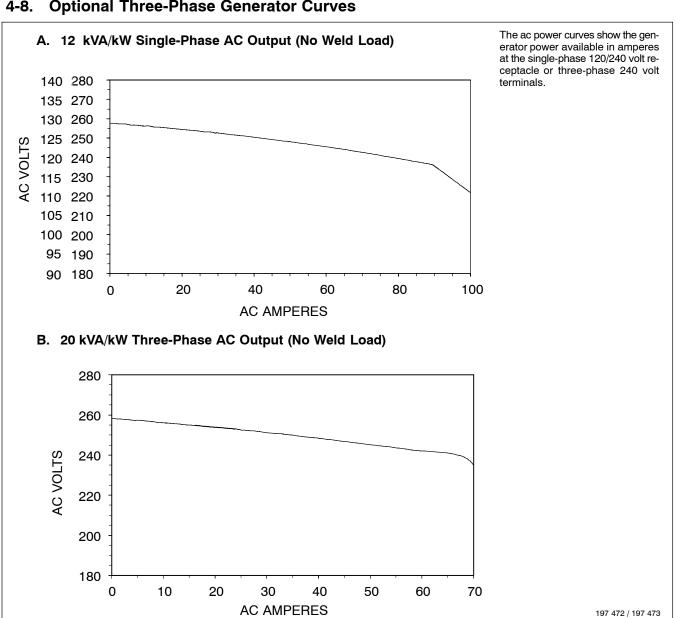
4-6. Duty Cycle And Overheating



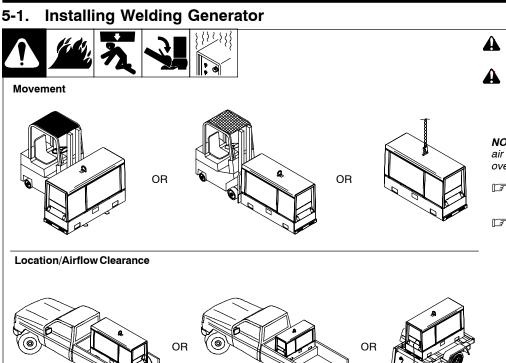
4-7. AC Generator Power Curve



4-8. **Optional Three-Phase Generator Curves**



SECTION 5 - INSTALLATION

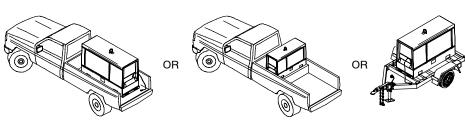


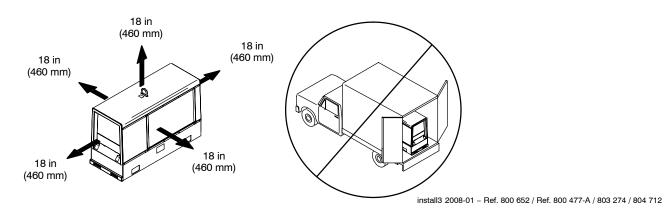
Do not move or operate unit where it could tip.

> Always securely fasten welding generator onto transport vehicle or trailer and comply with all DOT and other applicable codes.

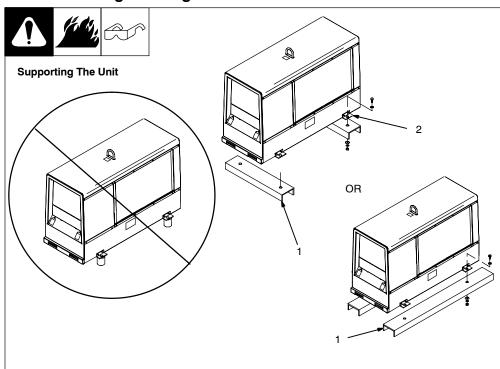
NOTICE - Do not install unit where air flow is restricted or engine may overheat.

- See Section 4-2 for lifting eye rat-
- See Section 5-2 for mounting information.

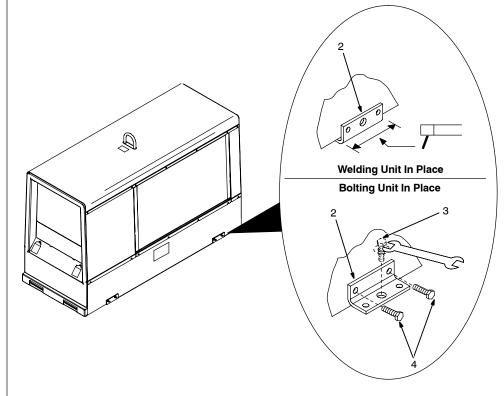




Mounting Welding Generator



Using Mounting Brackets



Do not weld on base. Welding on base can cause fuel

tank fire or explosion. Weld only on the four mounting brackets or bolt unit down.

NOTICE - Do not mount unit by supporting the base only at the four mounting brackets. Use cross-supports to adequately support unit and prevent damage to base.

Mounting Surface:

- Cross-Supports
- Mounting Brackets (Supplied)

Mount unit on flat surface or use cross-supports to support base. Secure unit with mounting brack-

- 1/2 in Bolt And Washer (Minimum - Not Supplied)
- 3/8-16 x 1 in Screws (Supplied)

To Bolt Unit In Place:

Remove hardware securing the four mounting brackets to the base. Reverse brackets and reattach to base with original hardware.

Mount unit to truck or trailer with 1/2 in (12 mm) or larger hardware (not supplied).

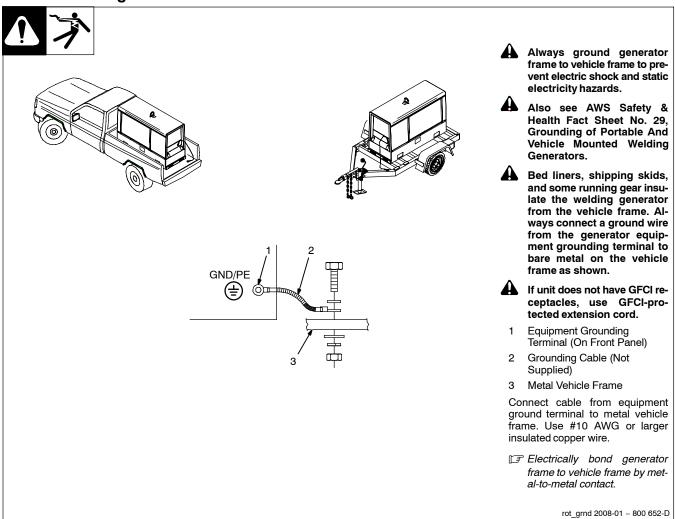
To Weld Unit In Place:

Weld unit to truck or trailer only at the four mounting brackets.

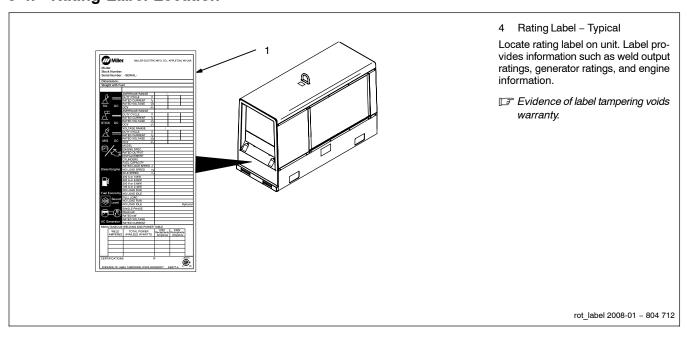
install3 2008--01 803 274 / 200 864-A / 803 231

Tools Needed: 9/16 in

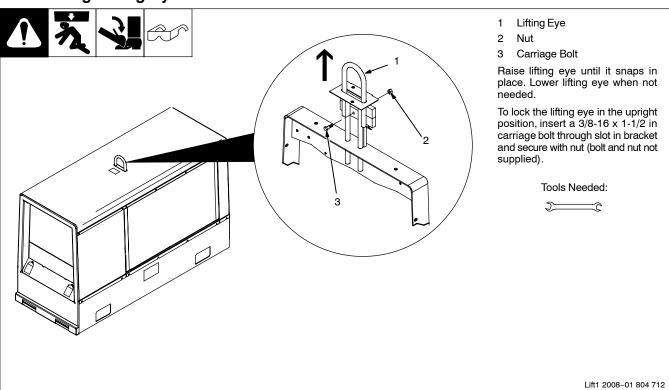
5-3. Grounding Generator To Truck Or Trailer Frame



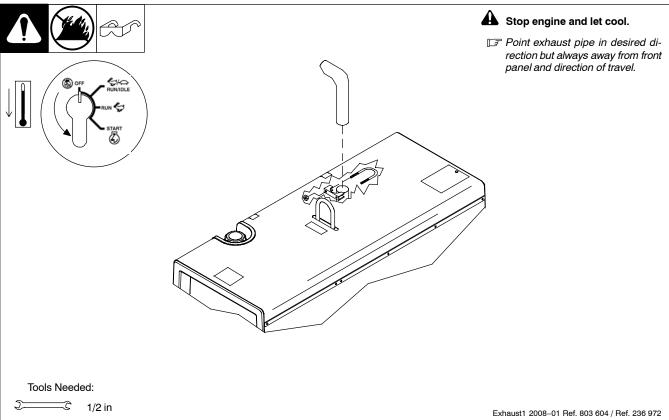
5-4. Rating Label Location



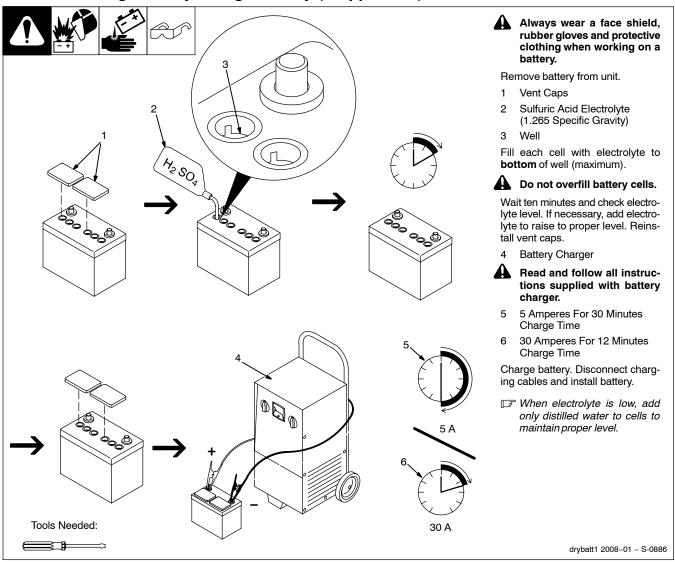
5-5. Using Lifting Eye



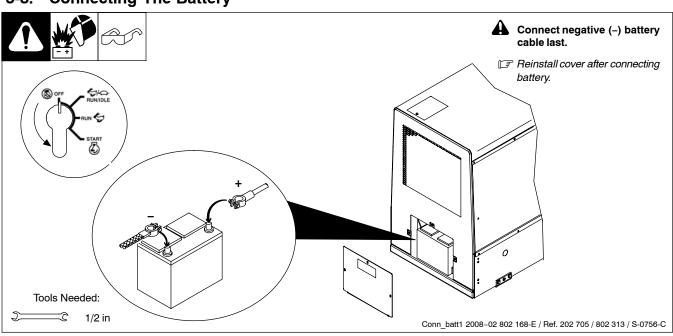
5-6. Installing Exhaust Pipe



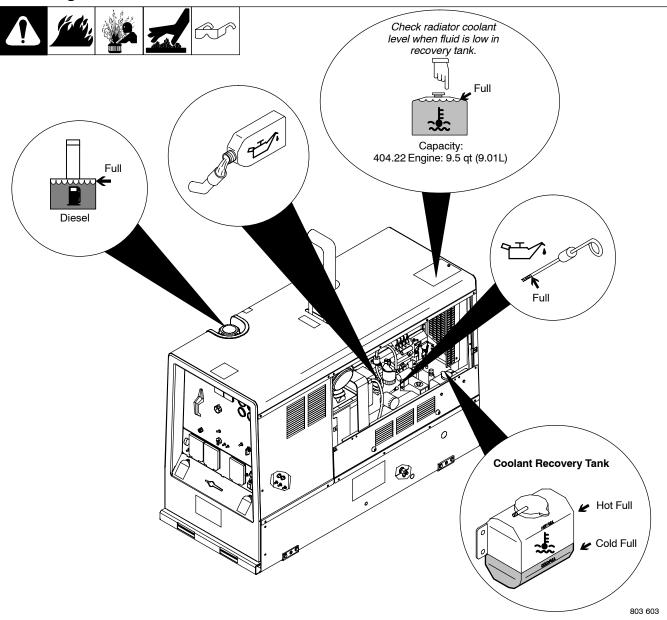
5-7. Activating The Dry Charge Battery (If Applicable)



5-8. Connecting The Battery



5-9. Engine Prestart Checks



Check all engine fluids daily.

Engine must be cold and on a level surface. Unit is shipped with 20W break-in oil.

Automatic shutdown system stops engine if oil pressure is too low, coolant temperature is too high, or engine overspeeds.

This unit has a low oil pressure shutdown switch. However, some conditions may cause engine damage before the engine shuts down. Check oil level often and do not use the oil pressure shutdown system to monitor oil level.

Follow run-in procedure in engine manual. If unburned fuel and oil collect in exhaust pipe during run-in, see Section 11.

Fuel

NOTICE – Do not use gasoline. Gasoline will damage engine.

The unit is shipped with enough fuel to prevent air from entering fuel system. Add fresh diesel fuel before starting (see engine maintenance label for fuel specifications). Leave filler neck empty to allow room for expansion.

Engine stops if fuel level is low.

Oil

After fueling, check oil with unit on level surface. If oil is not up to full mark on dipstick, add oil (see maintenance label).

Coolant

Check coolant level in radiator before starting unit the first time. If necessary, add coolant to radiator until coolant level is at bottom of filler neck.

Check coolant level in recovery tank daily. If necessary, add coolant to recovery tank until coolant level is between Cold Full and Hot Full levels. If recovery tank coolant level was low, also check coolant level in radiator. Add coolant if level is below bottom of radiator filler neck.

Unit is shipped with an engine coolant mixture of water and ethylene glycol base antifreeze rated to -34° F $(-37^{\circ}$ C). Add anti-

freeze to mixture if using the unit in temperatures below -34° F (-37° C).

Keep radiator and air intake clean and free of dirt.

NOTICE – Incorrect engine temperature can damage engine. Do not run engine without a properly working thermostat and radiator cap.

Use Starting Aid switch (see Section 6-1 or 7-1).

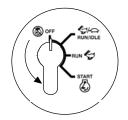
Keep battery in good condition. Store battery in warm area.

Use fuel formulated for cold weather (diesel fuel can gel in cold weather). Contact local fuel supplier for fuel information.

Use correct grade oil for cold weather (see Section 9-1).

5-10. Connecting To Weld Output Terminals





Stick and TIG Welding

For Stick and TIG welding Direct Current Electrode Positive (DCEP), connect electrode holder cable to Positive (+) terminal on left and work cable to Negative (-) terminal on right.

For Direct Current Electrode Negative (DCEN), reverse cable connections.

If equipped with optional Polarity switch or optional Polarity/AC switch, connect electrode holder cable to Electrode (+) terminal on left and work cable to Work (-) terminal on right.

MIG and FCAW Welding

For MIG and FCAW welding Direct Current Electrode Positive (DCEP) on CC/CV models, connect wire feeder cable to Positive (+) terminal on left and work cable to Negative (-) terminal on right. Use Process/Contactor switch to select type of weld output (see Section 7-3).

For Direct Current Electrode Negative (DCEN), reverse cable connections.

If equipped with optional Polarity switch or optional Polarity/AC switch, connect wire feeder cable to Electrode (+) terminal on left and work cable to Work (-) terminal on right.



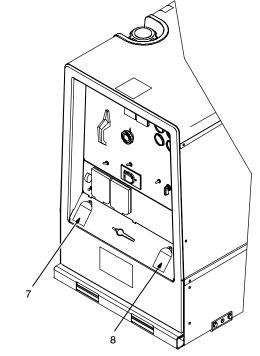
A Stop engine.

Failure to properly connect weld cables may cause excessive heat and start a fire, or damage your machine.

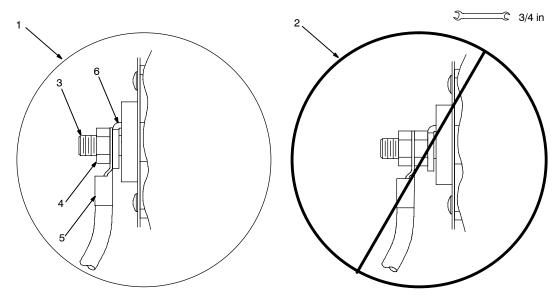
- I Do not place anything between weld cable terminal and copper bar. Make sure that the surface of the weld cable terminal and copper bar are both clean.
- Correct Weld Cable Connection
- 2 Incorrect Weld Cable Connection
- 3 Weld Output Terminal
- 4 Supplied Weld Output Terminal Nut
- Weld Cable Terminal
- 6 Copper Bar

Remove supplied nut from weld output terminal. Slide weld cable terminal onto weld output terminal and secure with nut so that weld cable terminal is tight against copper bar.

- Positive (+) Weld Output Terminal
- Negative (-) Weld Output Terminal







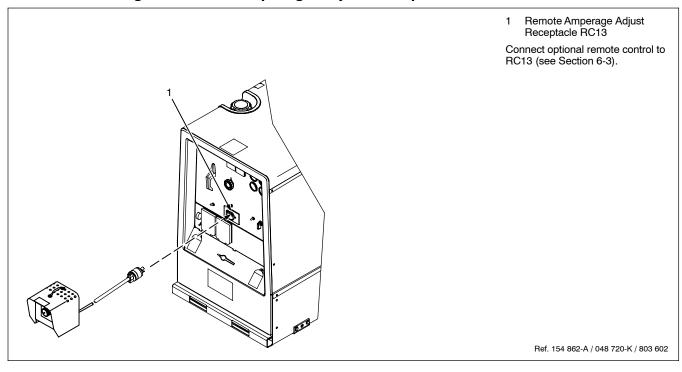
5-11. Selecting Weld Cable Sizes*

| | ↑ | | Weld Cable Size** and Total Cable (Copper) Length in Weld Circuit Not Exceeding*** | | | | | | | |
|---|-----------------------------------------------------------------|-----|------------------------------------------------------------------------------------|----------------|------------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| | | | 100 ft (30 m) or Less | | 150 ft (45 m) | 200 ft (60 m) | 250 ft (70 m) | 300 ft (90 m) | 350 ft (105 m) | 400 ft (120 m) |
| | Weld Output Terminals | | | | | | | | | |
| A | Welding 10 - 00 / 00 - 100 / 0 | | – 100% [| 00% Duty Cycle | | | | | | |
| A | Do not use worn, damaged, undersized, or poorly spliced cables. | | , , , , | , , , | | | | | | |
| | | 100 | 4 (20) | 4 (20) | 4 (20) | 3 (30) | 2 (35) | 1 (50) | 1/0 (60) | 1/0 (60) |
| | | 150 | 3 (30) | 3 (30) | 2 (35) | 1 (50) | 1/0 (60) | 2/0 (70) | 3/0 (95) | 3/0 (95) |
| | | 200 | 3 (30) | 2 (35) | 1 (50) | 1/0 (60) | 2/0 (70) | 3/0 (95) | 4/0 (120) | 4/0 (120) |
| | | 250 | 2 (35) | 1 (50) | 1/0 (60) | 2/0 (70) | 3/0 (95) | 4/0 (120) | 2 ea. 2/0 (2x70) | 2 ea. 2/0 (2x70) |
| | | 300 | 1 (50) | 1/0 (60) | 2/0 (70) | 3/0 (95) | 4/0 (120) | 2 ea. 2/0 (2x70) | 2 ea. 3/0 (2x95) | 2 ea. 3/0 (2x95) |
| | | 350 | 1/0 (60) | 2/0 (70) | 3/0 (95) | 4/0 (120) | 2 ea. 2/0 (2x70) | 2 ea. 3/0 (2x95) | 2 ea. 3/0 (2x95) | 2 ea. 4/0 (2x120) |
| | | 400 | 1/0 (60) | 2/0 (70) | 3/0 (95) | 4/0 (120) | 2 ea. 2/0 (2x70) | 2 ea. 3/0 (2x95) | 2 ea. 4/0 (2x120) | 2 ea. 4/0 (2x120) |
| | | 500 | 2/0 (70) | 3/0 (95) | 4/0 (120) | 2 ea. 2/0 (2x70) | 2 ea. 3/0 (2x95) | 2 ea. 4/0 (2x120) | 3 ea. 3/0 (3x95) | 3 ea. 3/0 (3x95) |

^{*}Chart is a general guideline and may not suit all applications. If cables overheat, use next size larger cable.

S-0007-F

5-12. Connecting To Remote Amperage Adjust Receptacle RC13 On CC Models

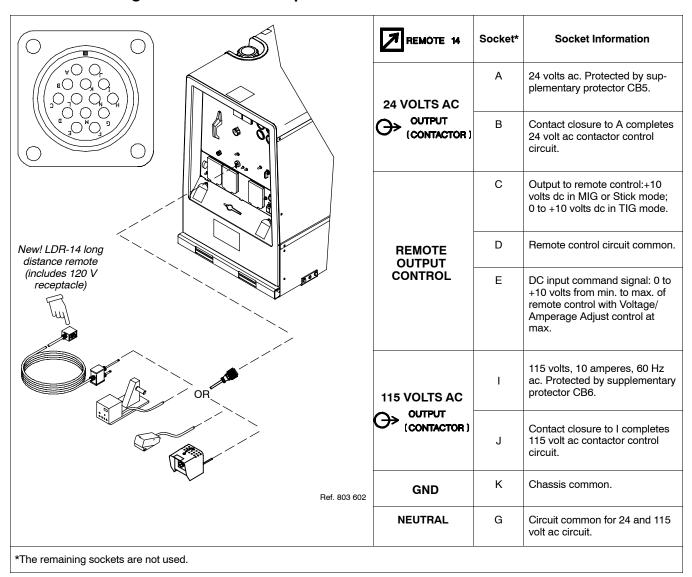


^{**}Weld cable size (AWG) is based on either a 4 volts or less drop or a current density of at least 300 circular mils per ampere.

^{() =} mm² for metric use

^{***}For distances longer than those shown in this guide, call a factory applications representative at 920-735-4505.

5-13. Connecting To Remote 14 Receptacle RC14 On CC/CV Models



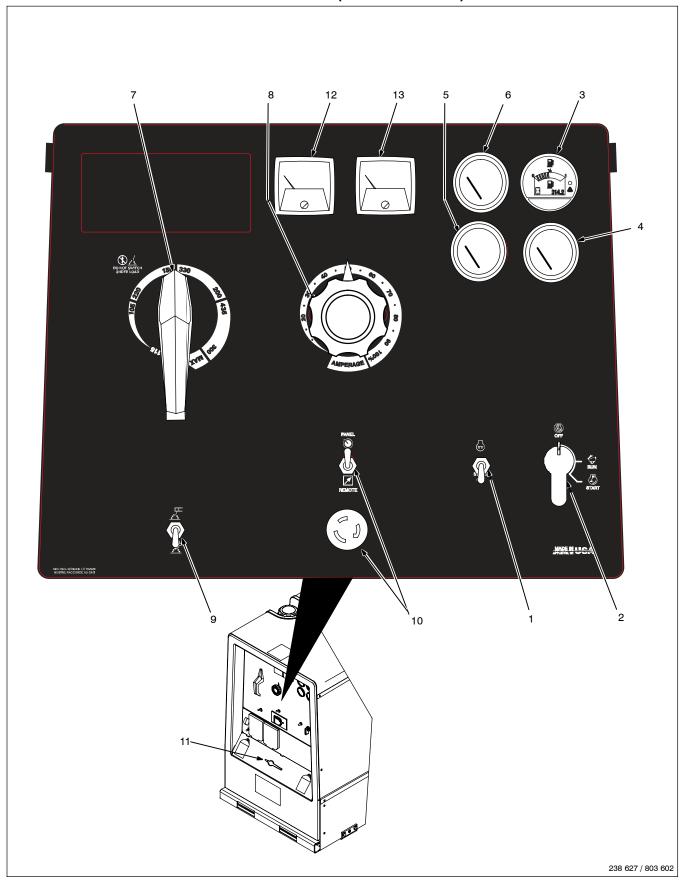
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Notes

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6-1. Front Panel Controls For CC Models (See Section 6-2)



6-2. Description Of Front Panel Controls For CC Models (See Section 6-1)



















Engine Starting Controls

1 Starting Aid Switch

Use switch to energize starting aid for cold weather starting (see starting instructions following).

2 Engine Control Switch

Use switch to start and stop engine.

To Start:

NOTICE – Do not use ether. Using ether voids warranty.

IF If engine does not start, let engine come to a complete stop before attempting restart

Above 32° F (0° C): turn Engine Control switch to Start. Release Engine Control switch when engine starts.

Below 32° F (0° C): push Starting Aid switch up for 20 seconds. While still holding Starting Aid switch, turn Engine Control switch to Start. Release Engine Control switch and Starting Aid switch when engine starts.

To Stop: turn Engine Control switch to Off position.

Engine Gauges And Meters

3 Engine Fuel/Hour Gauge

Use gauge to monitor engine running time for scheduling maintenance and to determine cause of engine shutdowns.

Use gauge to check fuel level. Engine stops if fuel level is low.

To check fuel level when engine is not running, turn Engine Control switch to Run or Run/Idle position.

See Section 7-5 for complete fuel/hour gauge information.

4 Battery Voltmeter (Optional)

Use gauge to check battery voltage and moni-

tor the engine charging system. The meter should read about 14 volts dc when the engine is running, and about 12 volts dc when the engine is stopped.

5 Engine Coolant Temperature Gauge

Normal temperature is 180 - 203° F (82 - 95° C). Engine stops if temperature exceeds 220° F (104° C).

6 Engine Oil Pressure Gauge

Normal pressure is 30 – 60 psi (207 – 414 kPa). Engine stops if pressure is below 10 psi (69 kPa).

Weld Controls

Max OCV Control Circuit: This unit has a max OCV control circuit that resets Amperage Adjust control R1 to maximum when the arc breaks. When an arc is struck, weld output control returns to the R1 front panel or combination front panel/ remote control setting. The Amperage Adjust control adjusts amperage only when welding and does not adjust opencircuit voltage.

The max OCV circuit is disabled when the Stick/TIG Selection switch is in Scratch Start TIG position (see item 9).

7 Ampere Range Switch

NOTICE - Do not switch under load.

Use switch to select weld amperage range. For most welding applications, use lowest amperage range possible to help prevent arc outages.

8 Amperage Adjust Control

Control adjusts amperage within range selected by Ampere Range switch. Weld output would be about 180 A DC with controls set as shown (50% of 150 to 330 A).

- The numbers around the control are for reference only and do not represent an actual percentage value.
- 9 Stick/TIG Selection Switch

Use switch to disable the max OCV circuit and the arc drive (dig) circuit for scratch start TIG welding (see max OCV note under Weld Controls).

When switch is in the Stick position, the max OCV circuit resets Amperage Adjust Control R1 to maximum when the arc breaks.

Also in the Stick position, the arc drive (dig) circuit provides additional amperage during low voltage (short arc length conditions) to prevent "sticking" electrodes.

When switch is in Scratch Start TIG position, the max OCV and arc drive (dig) circuits are disabled and OCV changes when the control is adjusted.

10 Amperage Adjust Switch And Remote Amperage Adjust Receptacle

Connect optional remote control to RC13 (See Section 5-12). Use switch to select front panel or remote amperage control. For remote control, place switch in Remote position and connect remote control to Remote Amperage Adjust receptacle RC13 (see Sections 5-12 and 6-3).

11 Polarity Switch (Optional)

NOTICE - Do not switch under load.

Use switch to change weld output. Select either DC Electrode Positive (DCEP) or DC Electrode Negative (DCEN).

Weld Meters

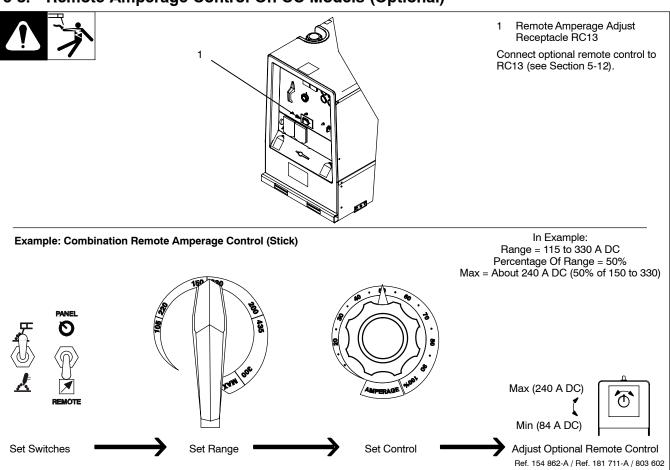
12 AC/DC Voltmeter (Optional)

Voltmeter displays voltage at the weld output terminals, but not necessarily the welding arc due to resistance of cable and connections.

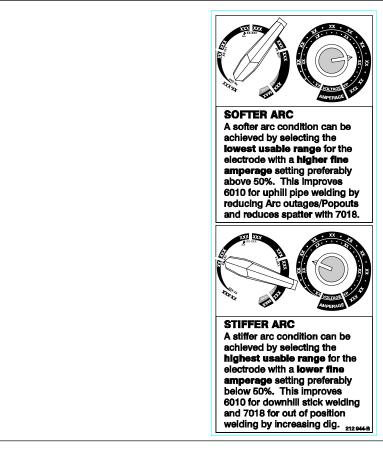
13 AC/DC Ammeter (Optional)

Ammeter displays amperage output of the unit.

6-3. Remote Amperage Control On CC Models (Optional)



6-4. Weld Control/Arc Condition Information Label

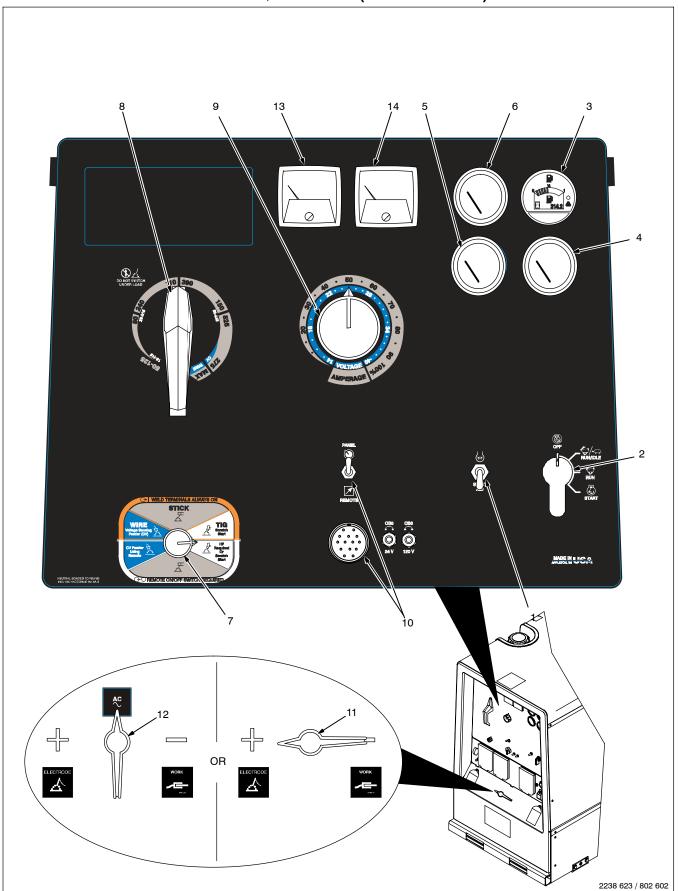


Set weld controls as shown to achieve softer or stiffer arc conditions for different applications.

212 944-B

| Notes |
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| |
| Work like a Pro! |
| Pros weld and cut |
| safely. Read the |
| safety rules at |
| the beginning |
| of this manual. |
| |
| |

7-1. Front Panel Controls For CC/CV Models (See Section 7-2)



7-2. Description Of Front Panel Controls For CC/CV Models (See Section 7-1)



















Engine Starting Controls

1 Starting Aid Switch

Use switch to energize starting aid for cold weather starting (see starting instructions following).

2 Engine Control Switch

Use switch to start engine, select engine speed (if unit has auto idle option), and stop engine.

In Run position, engine runs at weld/power speed. In Run/Idle position (optional), engine runs at idle speed at no load and weld speed with load applied.

To Start:

NOTICE – Do not use ether. Using ether voids warranty.

If engine does not start, let engine come to a complete stop before attempting restart.

Above 32° F (0° C): turn Engine Control switch to Start. Release Engine Control switch when engine starts.

Below 32° F (0° C): push Starting Aid switch up for 20 seconds. While still holding Starting Aid switch, turn Engine Control switch to Start. Release Engine Control switch and Starting Aid switch when engine starts.

To Stop: turn Engine Control switch to Off position.

Engine Gauges And Meters

3 Engine Hour Meter/Fuel Gauge

Use gauge to monitor engine running time for scheduling maintenance and to determine cause of engine shutdowns.

Use gauge to check fuel level. Engine stops if fuel level is low.

To check fuel level when engine is not running, turn Engine Control switch to Run or Run/Idle position.

See Section 7-5 for complete fuel/hour gauge information.

4 Battery Voltmeter (Optional)

Use gauge to check battery voltage and monitor the engine charging system. The meter should read about 14 volts dc when the engine is running, and about 12 volts dc when the engine is stopped.

5 Engine Coolant Temperature Gauge

Normal temperature is 180 - 203° F (82 - 95° C). Engine stops if temperature exceeds 220° F (104° C).

6 Engine Oil Pressure Gauge

Normal pressure is 30 – 60 psi (207 – 414 kPa). Engine stops if pressure is below 10 psi (69 kPa).

Weld Controls

7 Process/Contactor Switch

See Section 7-3 for Process/Contactor switch information.

8 Ampere Range Switch

NOTICE - Do not switch under load.

Use switch to select weld amperage range.

Use the lowest four ranges for Stick and TIG welding. Read the upper set of numbers at each range for Stick welding and the lower set at each range for TIG welding.

Use the highest range for MIG welding and for cutting and gouging (CAC-A).

For most welding applications, use lowest amperage range possible to help prevent arc outages.

9 Voltage/AmperageAdjust Control

With Process/Contactor switch in any Stick or TIG setting, use control to adjust amperage within range selected by Ampere Range switch. With Process/Contactor switch in any MIG position, use control to adjust voltage. With Voltage/Amperage Adjust Switch in Remote position, control limits the remote amperage in TIG mode, but has no effect in Stick and MIG modes.

Weld output would be about 250 A DC with controls set as shown (50% of 110 to 390 A).

- The numbers around the control are for reference only and do not represent an actual percentage value.
- 10 Voltage/Amperage Adjust Switch And Remote 14 Receptacle

Use switch to select front panel or remote voltage/amperage control. For remote control, place switch in Remote position and connect remote control to Remote 14 receptacle RC14 (see Sections 5-13 and 7-4).

11 Polarity Switch (Optional)

NOTICE - Do not switch under load.

Use Polarity switch to change weld output. Select either DC Electrode Positive (DCEP) or DC Electrode Negative (DCEN).

12 Polarity/AC Switch (Optional)



Electric shock can kill.



Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.



Use AC output ONLY if required for the welding process. If AC output is required, use remote output control if present on unit.

NOTICE - Do not switch under load.

Use Polarity/AC switch to select AC or DC weld output and DC weld output polarity. For Direct Current Electrode Negative (DCEN), turn switch to – (Negative) position. For Direct Current Electrode Positive (DCEP), turn switch to + (Positive) position. For weld processes that require alternating current (AC), use AC position.

Weld Meters

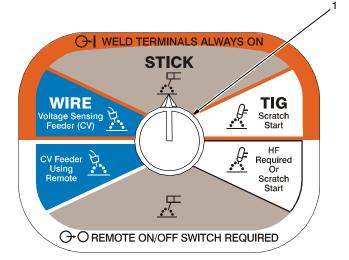
13 AC/DC Voltmeter (Optional)

Voltmeter displays voltage at the weld output terminals, but not necessarily the welding arc due to resistance of cable and connections.

14 AC/DC Ammeter (Optional)

Ammeter displays amperage output of the unit.

7-3. **Process/Contactor Switch On CC/CV Models**



Process/Contactor Switch

Weld output terminals are energized when Process/Contactor switch is in an Weld Terminals Always On position and the engine is running.



DC voltage is still present at the weld terminals when Process/ Contactor switch is in the Remote On/Off Switch Required -Stick position and the engine is running.

Use switch to select weld process and weld output on/off control (see table below and Section 7-4).

Place switch in Remote On/Off Switch Required positions to turn weld output on and off with a device connected to the remote 14 receptacle.

Place switch in Weld Terminals Always On positions for weld output to be on whenever the engine is running.

Use Stick position for air carbon arc (CAC-A) cutting and gouging.

When switch is in a Stick position, the arc drive (dig) circuit provides additional amperage during low voltage (short arc length conditions) to prevent "sticking" electrodes.

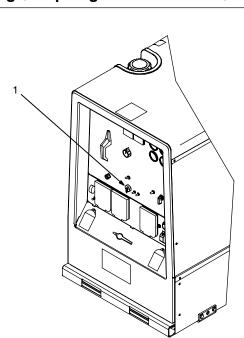
The arc drive (dig) circuit is disabled when switch is in MIG or TIG positions.

- Place switch in Weld Terminals Always On - Stick position when using optional three-phase generator (see Section 8-2).
- The engine auto idle option does not work in the Remote On/Off Switch Required-TIG mode.

| Process/Contactor Switch Settings | | | | |
|-----------------------------------------------------------------------|----------------------------------------------------------------|-------------------------|-----------------------------|--|
| Switch Setting | Process | Output On/Off Control | Engine Auto Idle (Optional) | |
| Remote On/Off Switch Required – TIG, HF Required Or Scratch Start TIG | GTAW With HF Unit, Pulsing Device, Or Remote Control | At Remote 14 Receptacle | Not Active | |
| Remote On/Off Switch Required – Stick | Stick (SMAW) With Remote On/Off | At Remote 14 Receptacle | Active | |
| Remote On/Off Switch Required – CV Feeder Using Remote | MIG (GMAW) | At Remote 14 Receptacle | Active | |
| Weld Terminals Always On – Wire | MIG (GMAW) | Electrode Hot | Active | |
| Weld Terminals Always On – Stick | Stick (SMAW), Air Carbon Arc (CAC-A) Cutting And Gouging | Electrode Hot | Active | |
| Weld Terminals Always On – TIG, Scratch Start | TIG Scratch Start (GTAW) | Electrode Hot | Active | |

7-4. Remote Voltage/Amperage Control On CC/CV Models (Optional)





1 Remote 14 Receptacle RC14 Connect optional remote control to RC14 (see Section 5-13).



In Example:
Process = Stick (Using Remote On/Off)
Range = 110 to 390 A DC
Min = 110 A DC

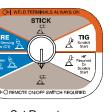


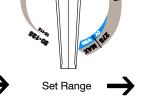


Set V/A

Adjust Switch















Adjust Optional Remote Control

Example: Combination Remote Amperage Control (TIG)

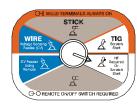
Process = TIG (Using Remote On/Off)
Range = 35 to 320 A DC
Percentage Of Range = 50%
Min = 35 A DC
Max = About 178 A DC (50% of 35 to 320)

In Example:



Set V/A

Adjust Switch







Set Control

Max (178 A DC)

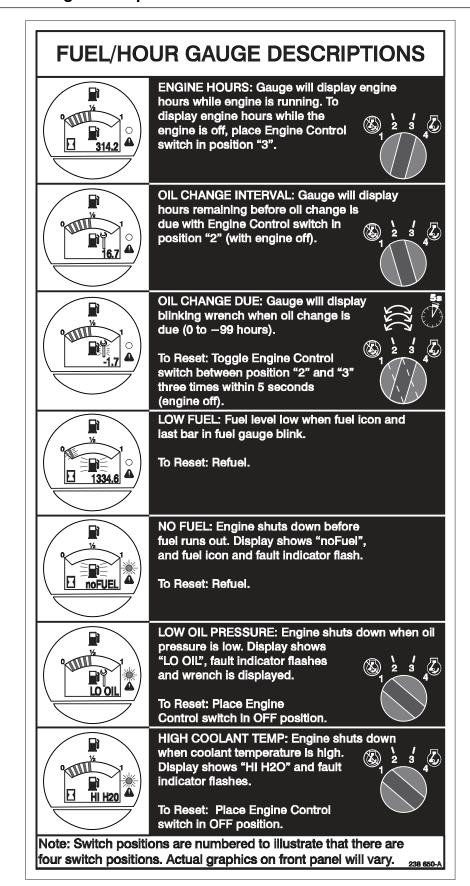
Min (35 A DC)





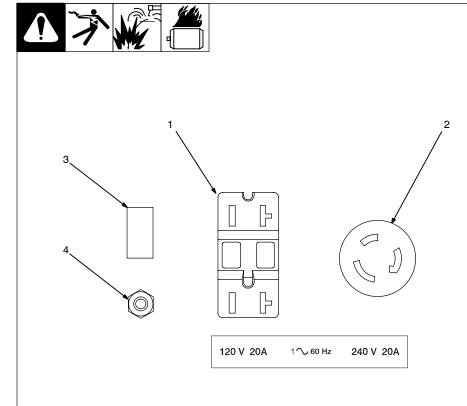
Adjust Optional Remote Control

0774 / Ref. 236 972 / Ref. 803 602



SECTION 8 – OPERATING AUXILIARY EQUIPMENT

8-1. Domestic Auxiliary Power Receptacles



- 1 120 V 20 A AC GFCI Receptacle GFCI1
- 2 240 V 30 A AC Twistlock Receptacle RC1

Receptacles supply 60 Hz singlephase power at weld/power speed.

If a ground fault is detected, GFCI Reset button pops out and receptacle does not work. Check for faulty tools plugged in receptacle. Press button to reset GFCI1.

- At least once a month, run engine at weld/power speed and press test button to verify GFCI is working properly.
- 3 Supplementary Protector CB1
- 4 Supplementary Protector CB2

CB1 protects RC1 and the generator winding from overload. If CB1 opens, RC1 and GFCI1 do not work. Place switch in On position to reset.

CB2 protects GFCI1 from overload. If CB2 opens, GFCI1 does not work. Press button to reset.

- If a supplementary protector continues to open, contact Factory Authorized Service Agent.
- Generator power is not affected by weld output.

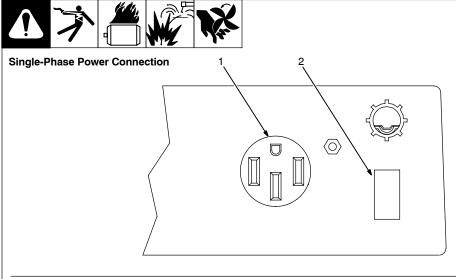
Maximum output is 2.4 kVA/kW from GFCI1 and 4 kVA/kW from RC1. Maximum output from all receptacles is 4 kVA/kW.

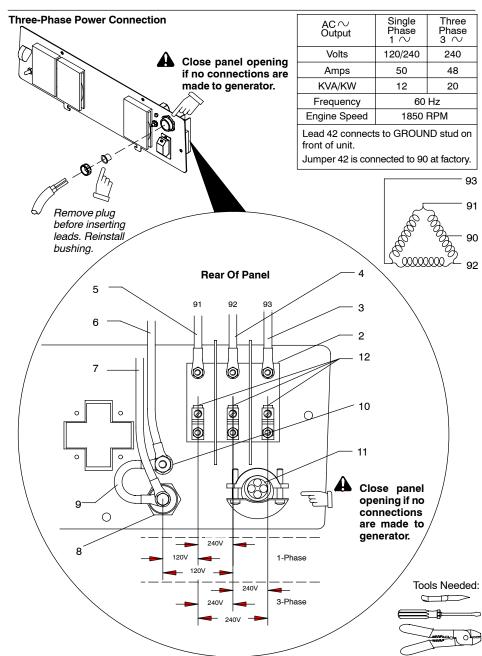
EXAMPLE: If 13 A is drawn from RC1, only 7 A is available at GFCI1:

 $(240 \text{ V} \times 13 \text{ A}) + (120 \text{ V} \times 7 \text{ A}) = 4.0 \text{ kVA/kW}$

191 624-A

8-2. Connecting To Optional Three-Phase Generator (CC/CV Models Only)





Place Process/Contactor switch in Weld Terminals Always On -Stick position when using threephase generator (see Section 7-3).

Single-Phase Generator Power

1 120/240 V 50 A Receptacle RC5

RC5 is connected to the optional three-phase generator and supplies 60 Hz single-phase power at weld/power speed. Maximum output from RC5 is 12 kVA/kW. Power available at RC5 is reduced when welding.

2 Supplementary Protector CB7

Supplementary protector CB7 protects single-phase receptacle RC5 and the load wires from overload. If CB7 opens, all generator output stops and the receptacle does not work.

Three-Phase Generator Power

4

Stop engine.

Power and weld outputs are live at the same time. Disconnect or insulate unused cables.

Have qualified person install according to circuit diagram and Generator Power Guidelines (see Section 12).

Remove generator power panel mounting screws. Tilt panel forward.

- 3 Lead 93
- 4 Lead 92
- 5 Lead 91
- 6 Lead 42 (Circuit Grounding Lead)
- 7 Lead 90 (Neutral)
- 8 Isolated Neutral Terminal
- 9 Jumper Lead 42
- 10 Grounding Terminal

Jumper 42 is connected to lead 90 at factory. Jumper 42 may be disconnected from neutral to meet applicable electrical codes.

Lead 42 connects to front panel Ground stud.

- 11 User-Supplied Leads
- 12 Supplementary Protector CB7 User Terminals

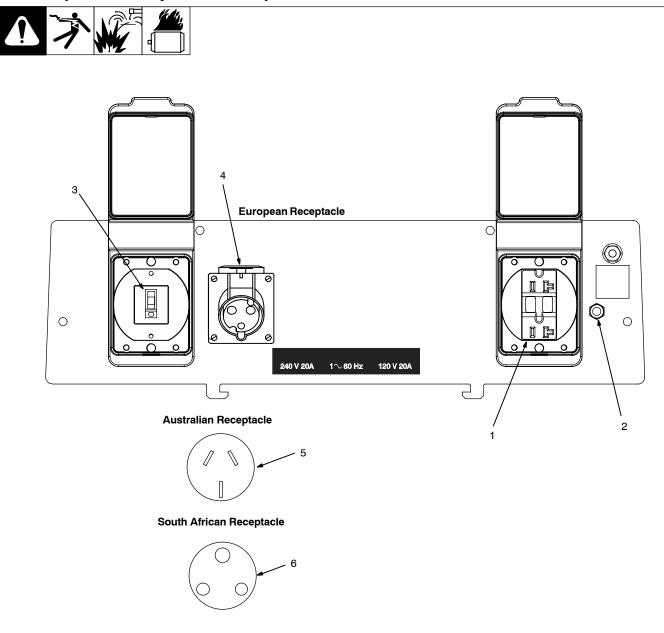
Connect user-supplied leads to terminals on CB7 and to the isolated neutral terminal and grounding terminal as necessary.

Supplementary protector CB7 protects single-phase receptacle RC5 and the load wires from overload. If CB7 opens, all generator output stops and the receptacle does not work.

Reinstall generator power panel.

Ref. 197 399 / 802 332-E / 803 655

8-3. Export Auxiliary Power Receptacles



238 127-A / 805 259-A

1 120V 15/20A AC Receptacle GFCI1

Receptacles supply 60 Hz single-phase power at weld/power speed.

If a ground fault is detected, GFCI1 Reset button pops out and receptacle does not work. Check for faulty tools plugged into receptacle. Press button to reset GFCI1.

At least once a month, run engine at weld/power speed and press test button to verify GFCI is working properly.

Maximum output is 2.4 kVA/kW from GFCI1 and 4 kVa/kW from RC1.

Maximum combined output of all recep-

tacles is 4 kVA/kW.

EXAMPLE: If 13 A is drawn from RC1, only 7 A is available at GFCI1:

 $(240 \text{ V} \times 13 \text{ A}) + (120 \text{ V} \times 7 \text{ A}) = 4.0 \text{ kVA/kW}$

2 Circuit Breaker CB2

CB2 protects GFCI1 from overload. If a circuit breaker opens, the receptacle does not work. Press CB2 to reset breaker.

3 Earth Leakage Circuit Breaker ELCB1

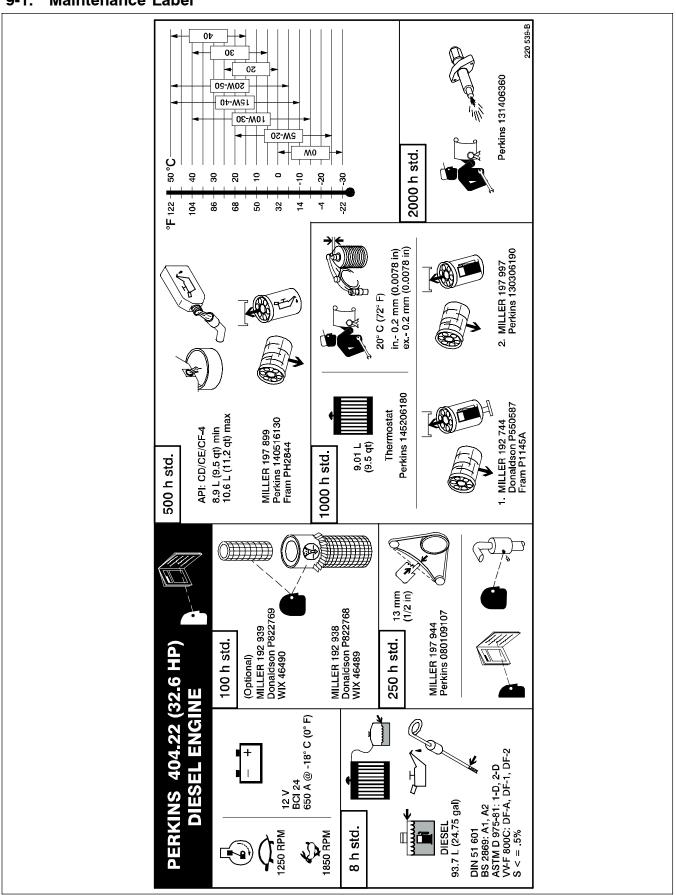
ELCB1 protects RC1 from Earth leakage fault. If circuit breaker opens the receptacle

does not work. Place circuit breaker switch in the On position to reset breaker.

- **Example 2.5 At least once a month, press test button. If ELCB is working properly, power will be disconnected. Reset breaker.
- 4 220V 16A AC European Receptacle RC1
- 5 240 V 15 A AC Australian Receptacle RC1
- 6 240 V 15 A AC South African Receptacle RC1
- If a circuit breaker continues to open, contact Factory Authorized Service Agent.

SECTION 9 - MAINTENANCE & TROUBLESHOOTING

9-1. Maintenance Label



9-2. Routine Maintenance

















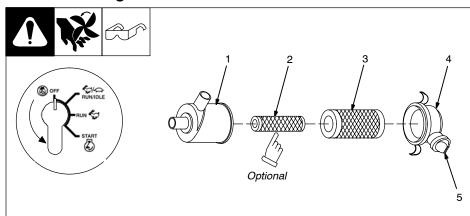
A Stop engine before maintaining.

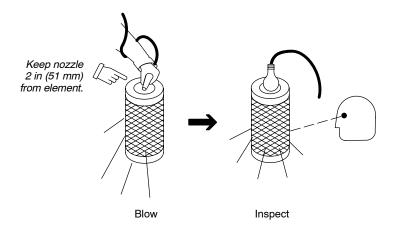
Recycle engine fluids.

See Engine Manual and Maintenance Label for important start-up, service and characteristics. for important start-up, service, and storage information. Service engine more often if used in severe conditions.

| Θ | ✓ = Check * To be done by Factory | = Change | x = Replace | | Reference |
|------------------------------|-------------------------------------|-------------------------------|-----------------------|------------------|---------------------------------------------------|
| Every 8 Hours | FUEL WATER | | | | Section 5-9, 9-6 |
| | ✓ Fuel/Water Separator | ✓ Fuel Level | ✓ Oil Level | Oil, Fuel Spills | |
| | | | | | |
| | ✓ Coolant Level | | | | |
| Every 50 Hours | | | | | |
| Every | ○ Weld Terminals | | 0 | | Section 9-3 |
| 100 Hours | | | | | Section 9-3 |
| | Battery Terminals | ✓ Air Cleaner Hoses | ✓ Air Cleaner Element | | |
| Every 250 Hours | WARNIN | (18 ² nifh) | | | Engine Manual, Section 9-4 |
| | ☆ Unreadable Labels | ✓ Fan Belt Tension | ✓ Spark Arrestor | | |
| Every 500 Hours | | | | | Section 9-6 |
| | ★ Weld Cables | ♦ Oil ♦ Oil Filter | | | |
| Every 1000 Hours | | OR OR | | SLUDGE FUEL | Section 5-9, 9-5, 9-6, and Engine Manual |
| | ✓Radiator Fluid Level | Inside Unit | ♦ Fuel Filter | Drain Sludge | |
| | | * | | | |
| | ✓ Slip Rings* ★ Brushes* | ✓Valve Clearance* | | | |
| Every 2000 Hours | Co. | | | | |
| | | | | | |

9-3. Servicing Air Cleaner





A Stop engine.

NOTICE – Do not run engine without air cleaner or with dirty element. Engine damage caused by using a damaged element is not covered by the warranty.

The air cleaner primary element can be cleaned but the dirt holding capacity of the filter is reduced with each cleaning. The chance of dirt reaching the clean side of the filter while cleaning and the possibility of filter damage makes cleaning a risk. Consider the risk of unwarrantable equipment damage when determining whether to clean or replace the primary element.

If you decide to clean the primary element, we strongly recommend installing an optional safety element to provide additional engine protection. **Never clean a safety element.** Replace the safety element after servicing the primary element three times.

Clean or replace primary element if dirty (see note above before cleaning). **Replace** primary element if damaged. Replace primary element yearly or after six cleanings.

- 1 Housing
- 2 Safety Element (Optional)
- 3 Primary Element
- 4 Dust Cap
- 5 Dust Ejector

To clean air filter:

Wipe off cap and housing. Remove cap and dump out dust. Remove element(s). Wipe dust from inside cap and housing with damp cloth. Reinstall safety element (if present). Reinstall cap.

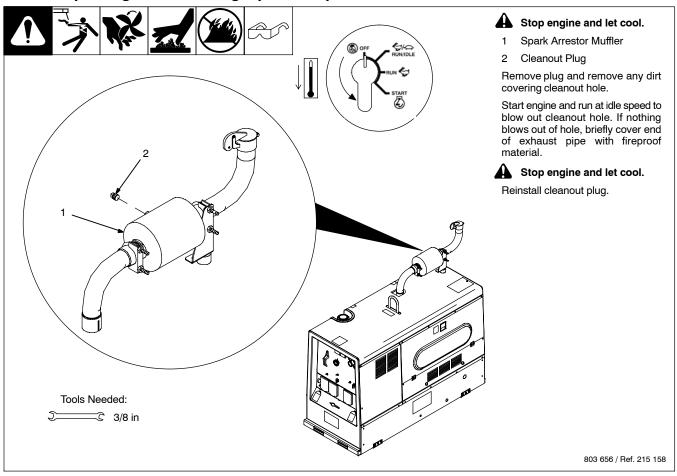
NOTICE – Do not clean housing with air hose

Clean primary element with compressed air only

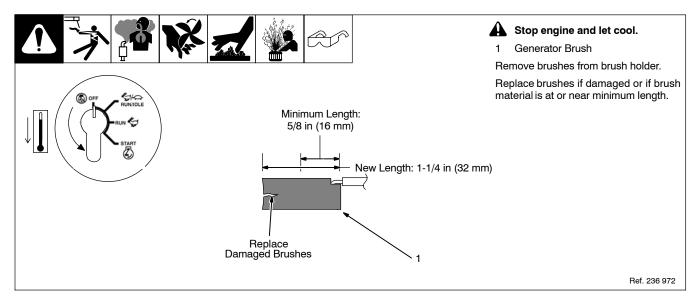
Air pressure must not exceed 100 psi (690 kPa). Use 1/8 in (3 mm) nozzle and keep nozzle at least 2 in (51 mm) from inside of element. Replace primary element if it has holes or damaged gaskets.

Reinstall primary element and cap (dust ejector down).

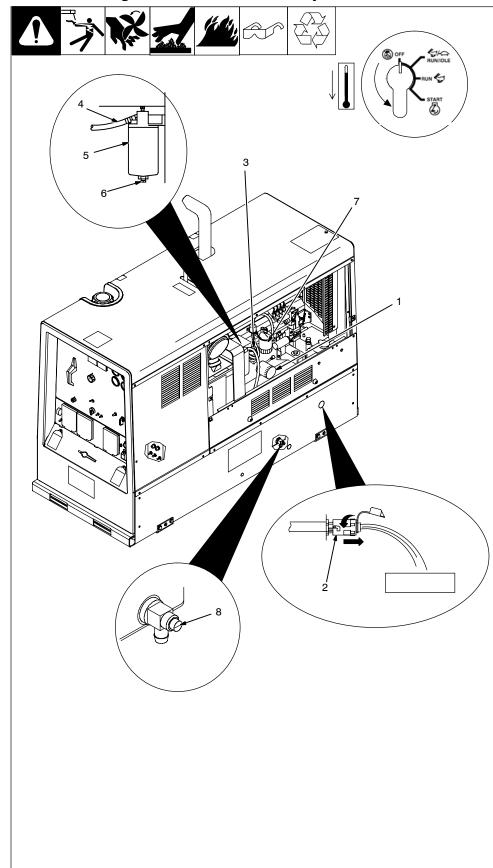
9-4. Inspecting And Cleaning Optional Spark Arrestor Muffler



9-5. Checking Generator Brushes



Servicing Fuel And Lubrication Systems



Stop engine and let cool.

After servicing, start engine and check for fuel leaks. Stop engine, tighten connections as necessary, and wipe up spilled fuel.

- Oil Filter 1
- 2 Oil Drain Valve And Hose
- 3 Oil Fill Cap
- 4 **Fuel Line**
- Primary Fuel Filter (Fuel/ Water Separator)
- Petcock 6
- Secondary Fuel Filter 7
- Fuel Tank Sludge Drain Valve

To change oil and filter:

Route oil drain hose and valve through hole in base. See engine manual and engine maintenance label for oil/filter change information.

To drain water from fuel system:

Open primary fuel filter petcock and drain water into metal container. Close petcock when water-free fuel flows.

To replace primary fuel filter:

Turn filter counterclockwise. Remove filter.

Fill new filter with fresh fuel. Apply thin coat of fuel to gasket on new filter. Install new filter and turn clockwise. Bleed air from fuel system according to engine manual.

Inspect fuel lines, and replace if cracked or worn.

To replace secondary fuel filter:

See engine manual.

To drain sludge from fuel tank:



Beware of fire. Do not smoke and keep sparks and flames away from drained fuel. Dispose of drained fuel in an environmentally-safe manner. Do not leave unit unattended while draining fuel tank.



Properly lift unit and secure in a level position. Use adequate blocks or stands to support unit while draining fuel tank.

Attach 1/2 ID hose to drain valve. Put metal container under drain, and use screwdriver to open sludge drain valve. Close valve when sludge has drained. Remove hose.

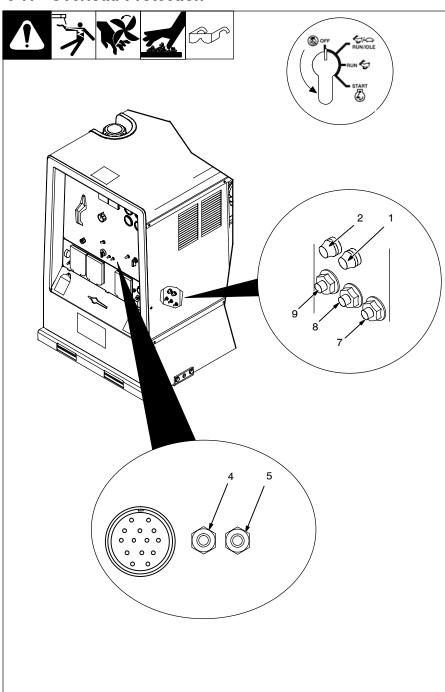
Close door.

Tools Needed:



802 490 / Ref. 801 434

9-7. Overload Protection



A Stop engine.

- IF When a supplementary protector, circuit breaker or fuse opens, it usually indicates a more serious problem exists. Contact Factory Authorized Service Agent.
- 1 Fuse F1
- 2 Fuse F2

F1 and F2 protect the stator exciter winding from overload. If F1 opens, weld and generator power is low or stops entirely. If F2 opens, weld output is low or stops entirely. 4 kVA/kW generator power is still available.

- 3 Circuit Breaker CB4 (Not Shown)
- 4 Supplementary Protector CB5 (CC/CV Models Only)
- 5 Supplementary Protector CB6 (CC/CV Models Only)
- 6 Circuit Breaker CB10 (Not Shown)
- 7 Supplementary Protector CB11
- 8 Supplementary Protector CB12
- 9 Supplementary Protector CB13

CB4 protects the welding arc drive (dig) circuit. If CB4 opens, electrode may stick to the workpiece more frequently during low voltage (short arc length) conditions. CB4 automatically resets when the fault is corrected.

CB5 protects the 24 volt ac output to remote receptacle RC14, and 24 volt output to field current regulator board PC1 (CC/CV models only). If CB5 opens, weld output and 24 volt output to RC14 stops. On units with optional three-phase generator, generator power output at receptacle RC5 also stops if CB5 opens.

CB6 protects the 115 volt ac output to remote receptacle RC14 (CC/CV models only). If CB6 opens, 115 volt output to RC14 stops.

CB10 protects the engine battery circuit. If CB10 opens, the engine will not crank. CB10 automatically resets when the fault is corrected.

CB11 protects the weld control circuit. On CC models, if CB11 opens the max OCV circuit does not work and open circuit voltage is variable at all times (see max OCV note under Weld Controls in Section 6-2). If CB11 opens on CV models, weld output stops (generator power is still available).

CB12 protects the field flashing circuit. If CB12 opens, the generator may not excite at start-up and weld and generator power output may not be available.

CB13 protects the engine control circuit. If CB13 opens, the engine does not crank.

Press button to reset.

9-8. Troubleshooting



A. Welding - CC Models

| Trouble | Remedy |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No weld output; generator power output okay at ac receptacles. | Check position of Ampere Range switch. |
| | Check position of optional Polarity switch. |
| | Place Amperage Adjust switch in Panel position, or place switch in Remote position and connect remote control to Remote Amperage Adjust receptacle RC13 (see Sections 5-12 and 6-1). |
| | Check and secure connections to Remote Amperage Adjust receptacle RC13 (see Section 5-12). |
| | Check fuse F2, and replace if open (see Section 9-7). Have Factory Authorized Service Agent check integrated rectifier SR2 and the rotor. |
| | Have Factory Authorized Service Agent check brushes and slip rings, and weld excitation circuit. |
| No weld output or generator power output at ac receptacles. | Disconnect equipment from generator power receptacles during start-up. |
| | Check fuses F1 and F2, and replace if open (see Section 9-7). Have Factory Authorized Service Agent check integrated rectifier SR1, capacitor C9, integrated rectifier SR2, and the rotor. |
| | Reset supplementary protector CB12. Have Factory Authorized Service Agent check diode D1 (see Section 9-7). |
| | Have Factory Authorized Service Agent check brushes and slip rings, and field excitation circuit. |
| Erratic weld output. | Check and tighten connections inside and outside unit. |
| | Be sure connection to work piece is clean and tight. |
| | Use dry, properly stored electrodes. |
| | Remove excessive coils from weld cables. |
| | Have Factory Authorized Service Agent check brushes and slip rings. |
| High weld output. | Check position of Ampere Range switch and Voltage/Amperage Adjust control. |
| | Check engine speed, and have Factory Authorized Service Agent adjust if necessary. |
| | Have Factory Authorized Service Agent check OCV control circuit. |
| Low weld output. | Check engine speed, and have Factory Authorized Service Agent adjust if necessary. |
| | Check fuses F1 and F2, and replace if open (see Section 9-7). Have Factory Authorized Service Agent check integrated rectifier SR1, capacitor C9, integrated rectifier SR2, and the rotor. |
| Electrode sticks to the workpiece more frequently during low voltage (short arc length) conditions. | Circuit breaker CB4 may be open. CB4 automatically resets when the fault is corrected (see Section 9-7). Have Factory Authorized Service Agent check transformer T1 and integrated rectifiers SR4 and SR5. |
| Low open-circuit voltage. | Check engine speed, and have Factory Authorized Service Agent adjust if necessary. |
| | Place Stick/TIG switch in Stick position. |
| Maximum weld output only in each ampere range (with Stick/TIG Selection switch in Stick position). | Have Factory Authorized Service Agent check control relay CR7. |
| No remote fine amperage control. | Place Amperage Adjust switch in Remote position. |
| | Check and secure connections to Remote Amperage Adjust receptacle RC13 (see Section 5-12). |
| | Reset supplementary protector CB11 (see Section 9-7). Have Factory Authorized Service Agent check control relay CR7. |
| | Repair or replace remote control device. |
| | Have Factory Authorized Service Agent check OCV control circuit. |

B. Welding - CC/CV Models

| Trouble | Remedy |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No weld output; generator power output okay at ac receptacles. | Place Process/Contactor switch in a Weld Terminals Always On position, or place switch in a Remote On/Off Switch Required position and connect remote contactor to optional Remote 14 receptacle RC14 (see Sections 5-13 and 7-1). |
| | Check position of Ampere Range switch. |
| | Check position of optional Polarity switch or Polarity/AC switch. |
| | Reset supplementary protector CB11 (see Section 9-7). |
| | Reset supplementary protector CB5 (see Section 9-7). Check for faulty remote device connected to RC14. |
| | Check and secure connections to Remote 14 receptacle RC14 (see Section 5-13). |
| | Have Factory Authorized Service Agent check connector board PC6 and connections. |
| | Check fuse F2, and replace if open (see Section 9-7). Have Factory Authorized Service Agent check brushes and slip rings, weld excitation circuit, field current regulator board PC1, and the rotor. |
| No weld output or generator power output at ac receptacles. | Disconnect equipment from generator power receptacles during start-up. |
| | Check fuses F1 and F2, and replace if open (see Section 9-7). Have Factory Authorized Service Agent check integrated rectifier SR1, capacitor C9, field current regulator board PC1, and the rotor. |
| | Reset supplementary protector CB12. Have Factory Authorized Service Agent check diode D1 (see Section 9-7). |
| | Have Factory Authorized Service Agent check brushes and slip rings, and field excitation circuit. |
| Erratic weld output. | Check and tighten connections inside and outside unit. |
| | Be sure connection to work piece is clean and tight. |
| | Use dry, properly stored electrodes. |
| | Remove excessive coils from weld cables. |
| | Have Factory Authorized Service Agent check brushes and slip rings. |
| High weld output. | Check position of Ampere Range switch and Voltage/Amperage Adjust control. |
| | Check engine speed, and have Factory Authorized Service Agent adjust if necessary. |
| | Have Factory Authorized Service Agent check field current regulator board PC1, and PC1 voltage feedback circuit. |
| Voltage/Amperage control does not work when welding in Stick mode. | Place Ampere Range switch in lower range. Voltage/Amperage control does not work with Ampere Range switch in highest range. |
| Low weld output. | Check position of Ampere Range switch and Voltage/Amperage Adjust control. |
| | Check engine speed, and have Factory Authorized Service Agent adjust if necessary. |
| | Check fuses F1 and F2, and replace if open (see Section 9-7). Have Factory Authorized Service Agent check integrated rectifier SR1, capacitor C9, field current regulator board PC1, and the rotor. |
| Electrode sticks to the workpiece more frequently during low voltage (short arc length) conditions. | Circuit breaker CB4 may be open. CB4 automatically resets when the fault is corrected (see Section 9-7). Have Factory Authorized Service Agent check transformer T1 and integrated rectifiers SR4 and SR5. |
| Low open-circuit voltage. | Check engine speed, and have Factory Authorized Service Agent adjust if necessary. |
| | Check position of Process/Contactor switch. |
| No remote fine amperage or voltage control. | Place Voltage/Amperage Adjust switch in Remote position. |
| | Check and secure connections to Remote 14 receptacle RC14 (see Section 5-13). |
| | Repair or replace remote control device. |
| | Have Factory Authorized Service Agent check PC1 sensing leads (36 and 37), and connections. |
| Constant speed wire feeder does not work. | Reset supplementary protector CB5 or CB6 (see Section 9-7). |

| Trouble | Remedy | |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------|--|
| | Check and secure connections to Remote 14 receptacle RC14 (see Section 5-13). | |
| | Repair or replace wire feeder. | |
| Low CV weld output. | Set Ampere Range switch to highest range. | |
| | Increase Voltage/Amperage Adjust Control setting. | |
| Min or max CV weld output only. | Check position of Voltage/Amperage Adjust control and Voltage/Amperage Adjust switch. | |
| | Repair or replace remote control device. | |
| | Have Factory Authorized Service Agent check Amperage/Voltage Adjust Control R1, and field current regulator board PC1. | |

C. Standard Generator Power

| Trouble | Remedy |
|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No generator power output at ac receptacles; weld output okay. | Reset receptacle supplementary protectors. |
| | Reset GFCI receptacle. |
| No generator power or weld output. | Disconnect equipment from generator power receptacles during start-up. |
| | Check fuses F1 and F2, and replace if open (see Section 9-7). Have Factory Authorized Service Agent check integrated rectifier SR1, capacitor C9, diode/capacitor board D1/C1, and the rotor. |
| | Reset supplementary protector CB12. Have Factory Authorized Service Agent check diode D1 . |
| | Have Factory Authorized Service Agent check brushes and slip rings, and field excitation circuit. |
| High output at generator power ac receptacles. | Check engine speed, and have Factory Authorized Service Agent adjust if necessary. |
| | Have Factory Authorized Service Agent adjust generator power field current resistor R3. |
| Low output at generator power ac receptacles. | Check engine speed, and have Factory Authorized Service Agent adjust if necessary. |
| | Check fuse F1, and replace if open (see Section 9-7). Have Factory Authorized Service Agent check integrated rectifier SR1, resistor R3, and capacitor C9. |

D. Optional Three-Phase Generator Power (CC/CV Models Only)

| Trouble | Remedy |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| No or low output at optional three- phase generator/receptacle RC5. | Place Process/Contactor switch in Weld Terminals Always On - Stick position (see Section 7-3). |
| | Reset supplementary protector CB7(see Section 8-2). |
| | Reset supplementary protector CB5 (see Section 9-7). |
| | Check engine weld/power speed, and have Factory Authorized Service Agent adjust if necessary. |
| | Have Factory Authorized Service Agent check brushes, slip rings, and field current regulator board PC1. |
| High output at optional three-phase generator/receptacle RC5. | Check engine weld/power speed, and have Factory Authorized Service Agent adjust if necessary. |
| | Have Factory Authorized Service Agent check field current regulator board PC1, and PC1 voltage feedback circuit. |
| Erratic output at optional three-phase generator/receptacle RC5. | Have Factory Authorized Service Agent check brushes and slip rings, and field current regulator board PC1. |

E. Engine

| Trouble | Remedy | |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Engine will not crank. | Check battery, and replace if necessary. | |
| | Check battery connections and tighten if necessary. | |
| | Circuit breaker CB10 may be open. CB10 automatically resets when fault is corrected (see Section 9-7). Have Factory Authorized Service Agent check engine wiring harness and components. | |

| Trouble | Remedy |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Check engine wiring harness plug connections. |
| | Have Factory Authorized Service Agent check control relay CR1, diode/capacitor board D8/C8, and Engine Control switch S1. |
| Engine cranks but does not start. | Check fuel level. |
| | Check battery and replace if necessary. Check engine charging system according to engine manual. |
| | Have Factory Authorized Service Agent check engine wiring harness, fuel/hour gauge, control relay CR5, fuel pump, fuel solenoid FS1, and diode/capacitor board D10/C10. |
| | Air in fuel system. See engine manual. |
| Engine starts, but stops after 30 seconds. | Check oil, and coolant levels. Automatic shutdown system stops engine if oil pressure is too low or coolant temperature is too high (see Section 5-9). Automatic shutdown system is inhibited for 30 seconds after start-up. |
| | Check engine speed. Overspeed shutdown automatically stops engine if speed is too high. Turn engine off and restart to resume operation. If unit continues to overspeed and shut down, have unit checked by a Factory Authorized Service Agent. |
| | Have Factory Authorized Service Agent check fuel/hour gauge, and control relay CR5. |
| Engine hard to start in cold weather. | Use starting aid switch (see Section 6-1 or 7-1). |
| | Keep battery in good condition. Store battery in warm area off cold surface. |
| | Use fuel formulated for cold weather (diesel fuel can gel in cold weather). Contact local fuel supplier for fuel information. |
| | Use correct grade oil for cold weather (see Section 9-1). |
| | Have Factory Authorized Service Agent check starting aid switch and glow plugs. |
| Engine suddenly stops. | Check oil and coolant levels. Automatic shutdown system stops engine if oil pressure is too low or coolant temperature is too high (see Section 5-9). Automatic shutdown system is inhibited for 30 seconds after start-up. |
| | See engine manual. |
| | Have Factory Authorized Service Agent check engine speed sensor. |
| Engine slowly stopped and cannot be restarted. | Check fuel level. |
| | Check engine air and fuel filters (see Sections 9-3 and 9-6). |
| | See engine manual. |
| Battery discharges between uses. | Turn Engine Control switch off when unit is not running. |
| | Clean top of battery with baking soda and water solution; rinse with clear water. |
| | Recharge or replace battery if necessary. |
| | Periodically recharge battery (approximately every 3 months). |
| Engine does not run at weld/power speed. | Have Factory Authorized Service Agent check engine controller, throttle actuator TS1, and speed sensor. |
| Engine idles, but does not come up to weld speed (models with idle option only). | Check for obstructed throttle actuator TS1. |
| | Have Factory Authorized Service Agent check idle module PC7, current transformer CT1, throttle actuator TS1, and engine controller. |
| Engine does not run at idle speed (models with idle option only). | CC models: place Stick/TIG Selection switch in Stick position. CC/CV models: place Process/Contactor switch in any position but Remote On/Off Switch Required-TIG. |
| | Check for obstructed throttle actuator. |
| | Have Factory Authorized Service Agent check idle module PC7, control relay CR6, throttle actuator TS1, speed sensor, and engine controller. |
| Engine uses oil during run-in period; wetstacking occurs. | Dry engine according to run-in procedure (see Section 11). |

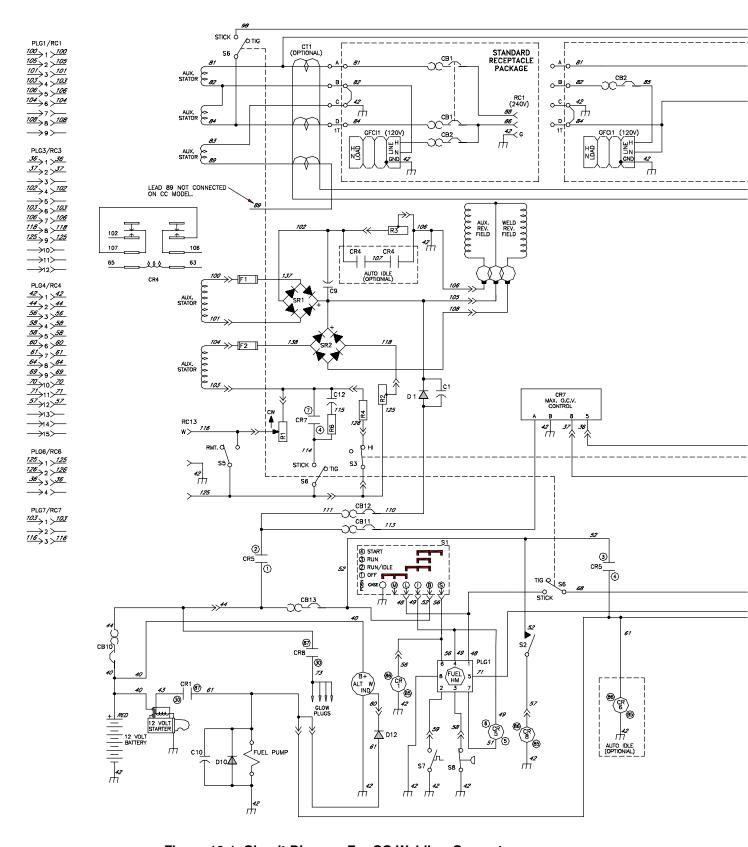
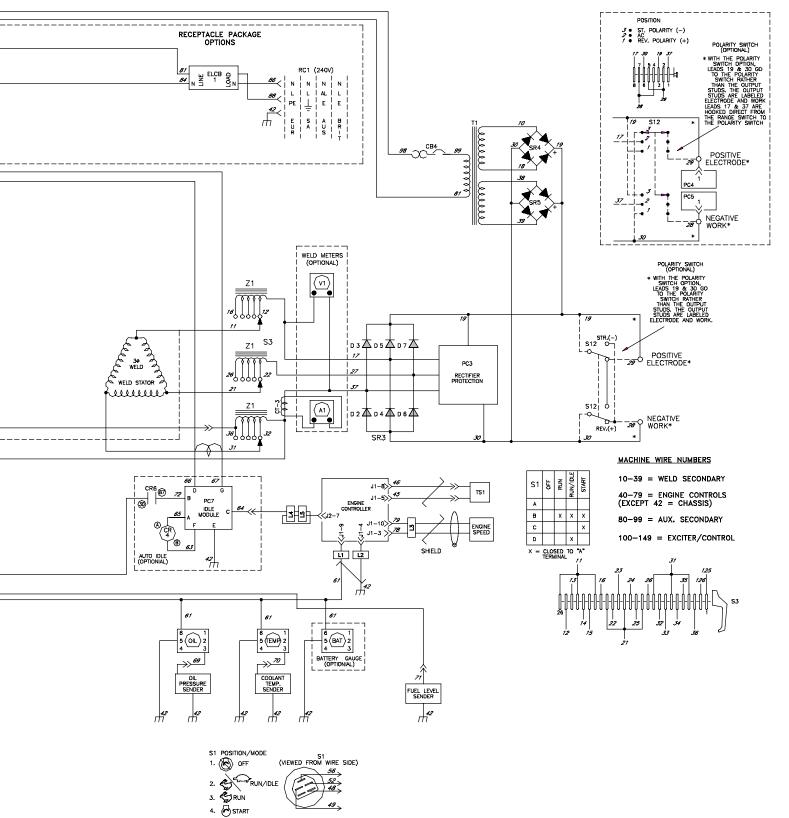
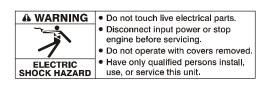


Figure 10-1. Circuit Diagram For CC Welding Generator



- **♠ WARNING** Do not touch live electrical parts. • Disconnect input power or stop engine before servicing.
 - Do not operate with covers removed. · Have only qualified persons install, use, or service this unit.





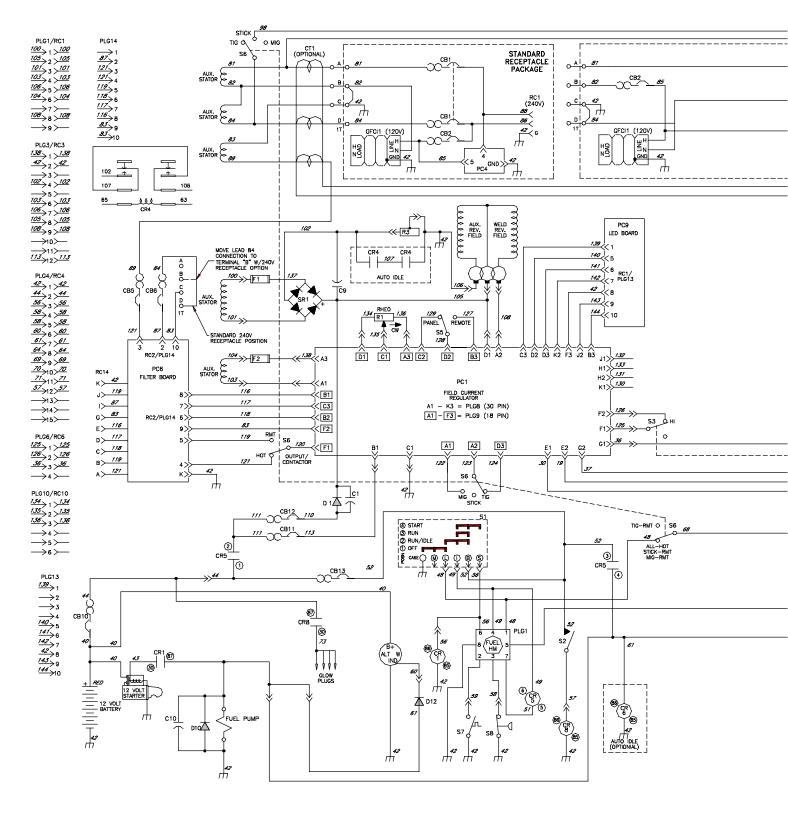
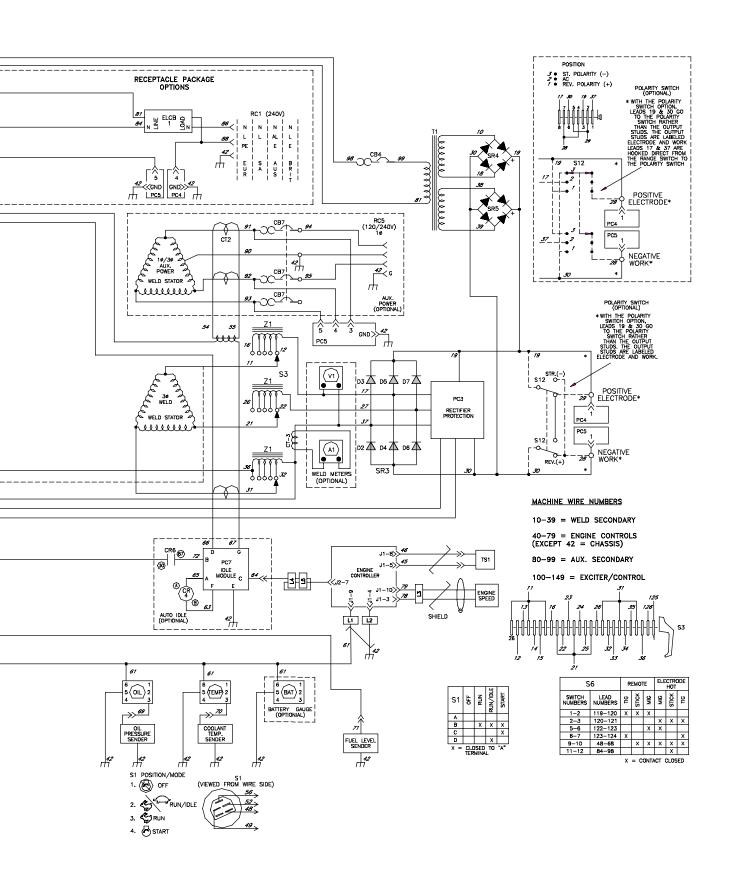
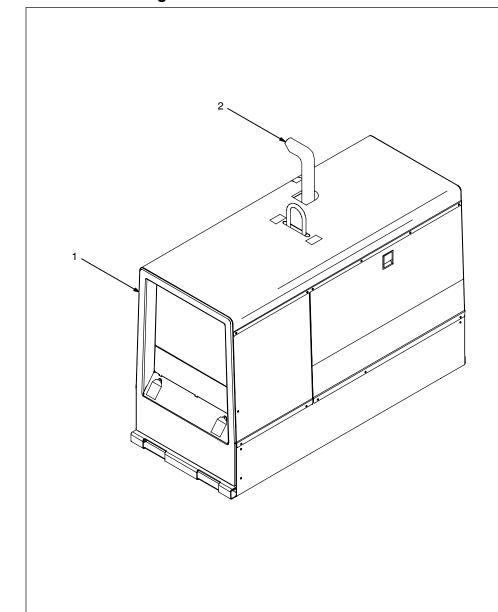


Figure 10-2. Circuit Diagram For CC/CV Welding Generator



11-1. Wetstacking



NOTICE – Do not perform run-in procedure at less than 20 volts weld output and do not exceed duty cycle or equipment damage may occur.

1 Welding Generator

Run diesel engines near rated voltage and current during run-in period to properly seat piston rings and prevent wetstacking. See nameplate, rating label, or specifications section in this manual to find rated voltage and current.

NOTICE – Do not idle engine longer than necessary. Piston rings seat faster if engine runs at weld/power rpm, and the welding generator is kept loaded during run-in.

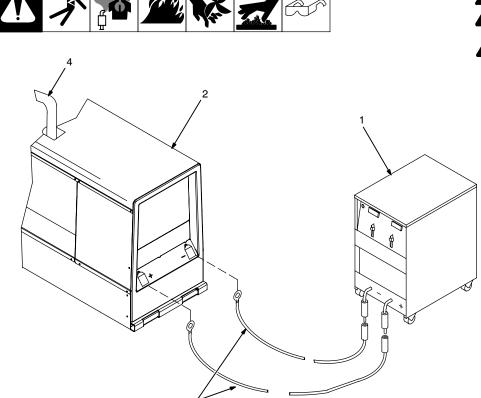
2 Engine Exhaust Pipe

Wetstacking is unburned fuel and oil in the exhaust pipe and occurs during run-in if the engine is run too long at light load or idle rpm.

If exhaust pipe is coated with a wet, black, tar-like substance, dry the engine using one of the following run-in procedures.

See the engine manual for additional engine run-in information.

11-2. Run-In Procedure Using Load Bank



A Stop engine.

Do not touch hot exhaust pipe, engine parts, or load bank/grid.

Keep exhaust and pipe away from flammables.

NOTICE – Do not perform runin procedure at less than 20 volts weld output and do not exceed duty cycle or equipment damage may occur.

1 Load Bank

Turn all load bank switches Off. If needed, connect load bank to 115 volts ac wall receptacle or generator auxiliary power receptacle.

2 Welding Generator

Place A/V range switch in maximum position, A/V control in minimum position, and Output Selector switch (if present) in either DC position.

3 Weld Cables

Connect load bank to generator weld output terminals using proper size weld cables with correct connectors. Observe correct polarity.

Start engine and run for several minutes.

Set load bank switches and then adjust generator A/V control so load equals rated voltage and current of generator (see nameplate, rating label, or the specifications section in this manual).

Check generator and load bank meters after first five minutes then every fifteen minutes to be sure generator is loaded properly.

NOTICE – Check oil level frequently during run-in; add oil if needed.

It is recommended to run the welding generator for two hours minimum and up to four hours under load. Place A/V control in minimum position, then turn off load bank to remove load. Run engine several minutes at no load.

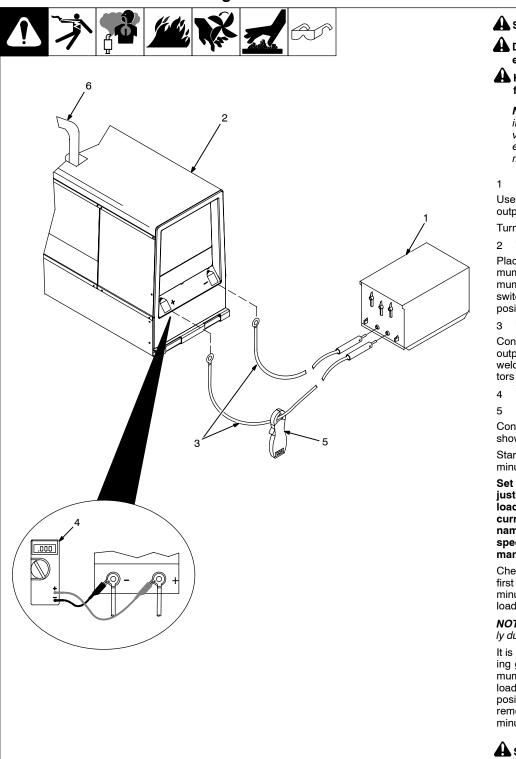
A Stop engine and let cool.

4 Engine Exhaust Pipe

Repeat procedure if wetstacking is present.

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11-3. Run-In Procedure Using Resistance Grid



A Stop engine.

Do not touch hot exhaust pipe, engine parts, or load bank/grid.

Keep exhaust and pipe away from flammables.

NOTICE - Do not perform runin procedure at less than 20 volts weld output and do not exceed duty cycle or equipment damage may occur.

1 Resistance Grid

Use grid sized for generator rated output.

Turn Off grid.

2 Welding Generator

Place A/V range switch in maximum position, A/V control in minimum position, and Output Selector switch (if present) in either DC position.

3 Weld Cables

Connect grid to generator weld output terminals using proper size weld cables with correct connectors (polarity is not important).

- 4 Voltmeter
- 5 Clamp-On Ammeter

Connect voltmeter and ammeter as shown, if not provided on generator.

Start engine and run for several minutes.

Set grid switches and then adjust generator A/V control so load equals rated voltage and current of the generator (see nameplate, rating label, or the specifications section in this manual).

Check generator and meters after first five minutes then every fifteen minutes to be sure generator is loaded properly.

NOTICE – Check oil level frequently during run-in; add oil if needed.

It is recommended to run the welding generator for two hours minimum and up to four hours under load. Place A/V control in minimum position, then shut down grid to remove load. Run engine several minutes at no load.

A Stop engine and let cool.

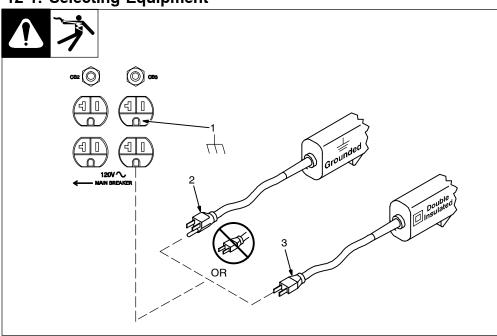
6 Engine Exhaust Pipe

Repeat procedure if wetstacking is present.

SECTION 12 – GENERATOR POWER GUIDELINES

The views in this section are intended to be representative of all engine-driven welding generators. Your unit may differ from those shown.

12-1. Selecting Equipment



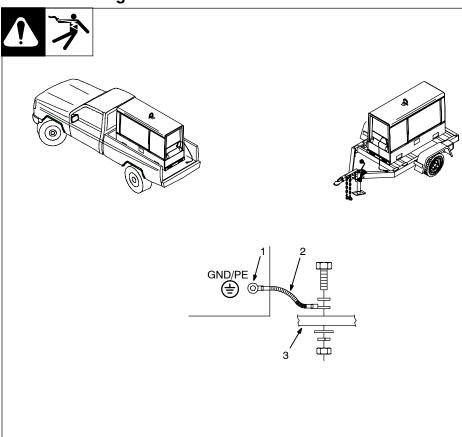
- 1 Generator Power Receptacles
 - Neutral Bonded To Frame
- 2 3-Prong Plug From Case Grounded Equipment
- 3 2-Prong Plug From Double Insulated Equipment
- Be sure equipment has double insulated symbol and/or wording on it.



Do not use 2-prong plug unless equipment is double insulated.

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12-2. Grounding Generator To Truck Or Trailer Frame



A

Always ground generator frame to vehicle frame to prevent electric shock and static electricity hazards.



Also see AWS Safety & Health Fact Sheet No. 29, Grounding of Portable And Vehicle Mounted Welding Generators.

- 1 Equipment Grounding Terminal (On Front Panel)
- Grounding Cable (Not Supplied)
- 3 Metal Vehicle Frame

Connect cable from equipment ground terminal to metal vehicle frame. Use #10 AWG or larger insulated copper wire.

F Electrically bond generator frame to vehicle frame by metal-to-metal contact.



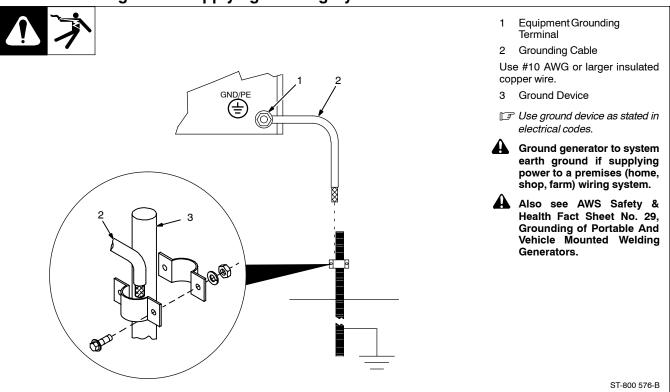
Bed liners, shipping skids, and some running gear insulate the welding generator from the vehicle frame. Always connect a ground wire from the generator equipment grounding terminal to bare metal on the vehicle frame as shown.



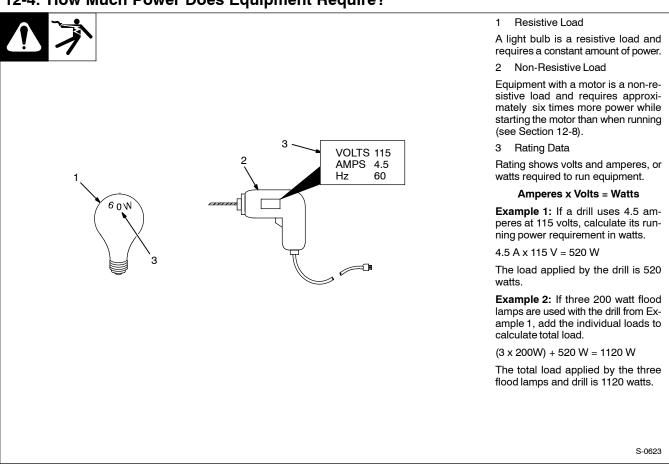
If unit does not have GFCI receptacles, use GFCI-protected extension cord.

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12-3. Grounding When Supplying Building Systems



12-4. How Much Power Does Equipment Require?



12-5. Approximate Power Requirements For Industrial Motors

| Industrial Motors | Rating | Starting Watts | Running Watts |
|-------------------------------|----------|----------------|---------------|
| Split Phase | 1/8 HP | 800 | 300 |
| | 1/6 HP | 1225 | 500 |
| | 1/4 HP | 1600 | 600 |
| | 1/3 HP | 2100 | 700 |
| | 1/2 HP | 3175 | 875 |
| Capacitor Start-Induction Run | 1/3 HP | 2020 | 720 |
| | 1/2 HP | 3075 | 975 |
| | 3/4 HP | 4500 | 1400 |
| | 1 HP | 6100 | 1600 |
| | 1-1/2 HP | 8200 | 2200 |
| | 2 HP | 10550 | 2850 |
| | 3 HP | 15900 | 3900 |
| | 5 HP | 23300 | 6800 |
| Capacitor Start-Capacitor Run | 1-1/2 HP | 8100 | 2000 |
| | 5 HP | 23300 | 6000 |
| | 7-1/2 HP | 35000 | 8000 |
| | 10 HP | 46700 | 10700 |
| Fan Duty | 1/8 HP | 1000 | 400 |
| | 1/6 HP | 1400 | 550 |
| | 1/4 HP | 1850 | 650 |
| | 1/3 HP | 2400 | 800 |
| | 1/2 HP | 3500 | 1100 |

12-6. Approximate Power Requirements For Farm/Home Equipment

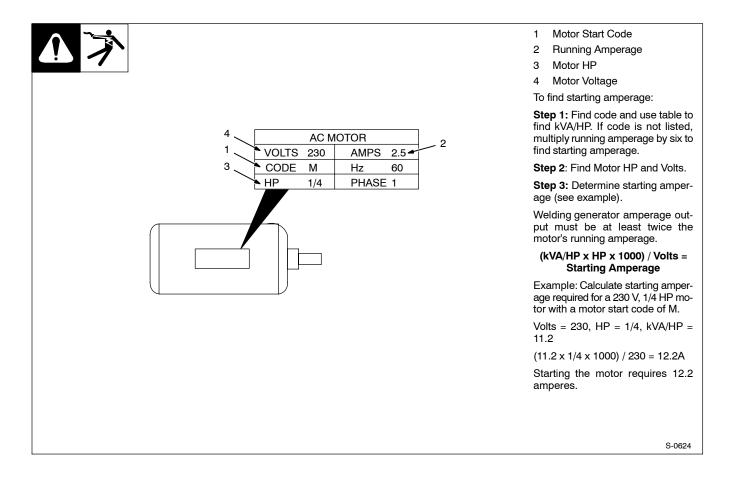
| Farm/Home Equipment | Rating | Starting Watts | Running Watts |
|----------------------------|----------|----------------|---------------|
| Stock Tank De-Icer | | 1000 | 1000 |
| Grain Cleaner | 1/4 HP | 1650 | 650 |
| Portable Conveyor | 1/2 HP | 3400 | 1000 |
| Grain Elevator | 3/4 HP | 4400 | 1400 |
| Milk Cooler | | 2900 | 1100 |
| Milker (Vacuum Pump) | 2 HP | 10500 | 2800 |
| FARM DUTY MOTORS | 1/3 HP | 1720 | 720 |
| Std. (e.g. Conveyors, | 1/2 HP | 2575 | 975 |
| Feed Augers, Air | 3/4 HP | 4500 | 1400 |
| Compressors) | 1 HP | 6100 | 1600 |
| | 1-1/2 HP | 8200 | 2200 |
| | 2 HP | 10550 | 2850 |
| | 3 HP | 15900 | 3900 |
| | 5 HP | 23300 | 6800 |
| High Torque (e.g. Barn | 1-1/2 HP | 8100 | 2000 |
| Cleaners, Silo Unloaders, | 5 HP | 23300 | 6000 |
| Silo Hoists, Bunk Feeders) | 7-1/2 HP | 35000 | 8000 |
| | 10 HP | 46700 | 10700 |
| 3-1/2 cu. ft. Mixer | 1/2 HP | 3300 | 1000 |
| High Pressure 1.8 Gal/Min | 500 PSI | 3150 | 950 |
| Washer 2 gal/min | 550 PSI | 4500 | 1400 |
| 2 gal/min | 700 PSI | 6100 | 1600 |
| Refrigerator or Freezer | | 3100 | 800 |
| Shallow Well Pump | 1/3 HP | 2150 | 750 |
| | 1/2 HP | 3100 | 1000 |
| Sump Pump | 1/3 HP | 2100 | 800 |
| | 1/2 HP | 3200 | 1050 |

12-7. Approximate Power Requirements For Contractor Equipment

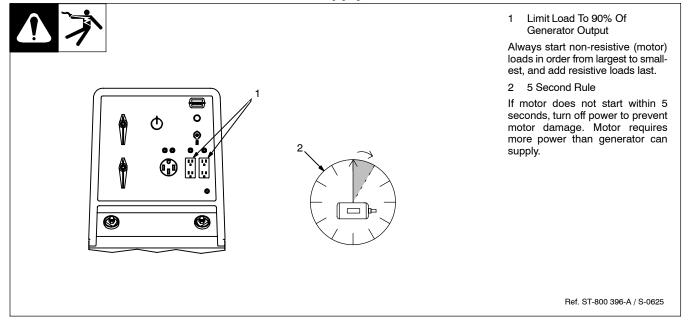
| Contractor | Rating | Starting Watts | Running Watts |
|----------------------|------------------|----------------|---------------|
| Hand Drill | 1/4 in | 350 | 350 |
| | 3/8 in | 400 | 400 |
| | 1/2 in | 600 | 600 |
| Circular Saw | 6-1/2 in | 500 | 500 |
| | 7-1/4 in | 900 | 900 |
| | 8-1/4 in | 1400 | 1400 |
| Table Saw | 9 in | 4500 | 1500 |
| | 10 in | 6300 | 1800 |
| Band Saw | 14 in | 2500 | 1100 |
| Bench Grinder | 6 in | 1720 | 720 |
| | 8 in | 3900 | 1400 |
| | 10 in | 5200 | 1600 |
| Air Compressor | 1/2 HP | 3000 | 1000 |
| | 1 HP | 6000 | 1500 |
| | 1-1/2 HP | 8200 | 2200 |
| | 2 HP | 10500 | 2800 |
| Electric Chain Saw | 1-1/2 HP, 12 in | 1100 | 1100 |
| | 2 HP, 14 in | 1100 | 1100 |
| Electric Trimmer | Standard 9 in | 350 | 350 |
| | Heavy Duty 12 in | 500 | 500 |
| Electric Cultivator | 1/3 HP | 2100 | 700 |
| Elec. Hedge Trimmer | 18 in | 400 | 400 |
| Flood Lights | HID | 125 | 100 |
| | Metal Halide | 313 | 250 |
| | Mercury | 1000 | |
| | Sodium | 1400 | |
| | Vapor | 1250 | 1000 |
| Submersible Pump | 400 gph | 600 | 200 |
| Centrifugal Pump | 900 gph | 900 | 500 |
| Floor Polisher | 3/4 HP, 16 in | 4500 | 1400 |
| | 1 HP, 20 in | 6100 | 1600 |
| High Pressure Washer | 1/2 HP | 3150 | 950 |
| | 3/4 HP | 4500 | 1400 |
| | 1 HP | 6100 | 1600 |
| 55 gal Drum Mixer | 1/4 HP | 1900 | 700 |
| Wet & Dry Vac | 1.7 HP | 900 | 900 |
| | 2-1/2 HP | 1300 | 1300 |

12-8. Power Required To Start Motor

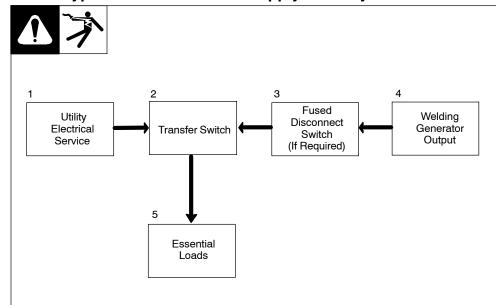
| Single-Phase Induction Motor Starting Requirements | | | | | | | | |
|----------------------------------------------------|-----|-----|-----|-----|------|------|------|------|
| Motor Start Code | G | Н | J | К | L | M | N | Р |
| KVA/HP | 6.3 | 7.1 | 8.0 | 9.0 | 10.0 | 11.2 | 12.5 | 14.0 |



12-9. How Much Power Can Generator Supply?



12-10. Typical Connections To Supply Standby Power





Have only qualified persons perform these connections according to all applicable codes and safety practices.



Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.

Customer-supplied equipment is required if generator will supply standby power during emergencies or power outages.

- 1 Utility Electrical Service
- 2 Transfer Switch (Double-Throw)

Switch transfers the electrical load from electric utility service to the generator. Transfer load back to electric utility when service is restored.

Install correct switch (customersupplied). Switch rating must be same as or greater than the branch overcurrent protection.

3 Fused Disconnect Switch

Install correct switch (customersupplied) if required by electrical code.

4 Welding Generator Output

Generator output voltage and wiring must be consistent with regular (utility) system voltage and wiring.

Connect generator with temporary or permanent wiring suitable for the installation.

Turn off or unplug all equipment connected to generator before starting or stopping engine. When starting or stopping, the engine has low speed which causes low voltage and frequency.

5 Essential Loads

Generator output may not meet the electrical requirements of the premises. If generator does not produce enough output to meet all requirements, connect only essential loads (pumps, freezers, heaters, etc. – See Section 12-4).

12-11. Selecting Extension Cord (Use Shortest Cord Possible)

Cord Lengths for 120 Volt Loads



A If unit does not have GFCI receptacles, use GFCI-protected extension cord.

| | Load (Watts) | Maximum Allowable Cord Length in ft (m) for Conductor Size (AWG)* | | | | | | |
|----------------------|--------------|-------------------------------------------------------------------|-----------|-----------|----------|----------|----------|--|
| Current (Amperes) | | 4 | 6 | 8 | 10 | 12 | 14 | |
| 5 | 600 | | | 350 (106) | 225 (68) | 137 (42) | 100 (30) | |
| 7 | 840 | | 400 (122) | 250 (76) | 150 (46) | 100 (30) | 62 (19) | |
| 10 | 1200 | 400 (122) | 275 (84) | 175 (53) | 112 (34) | 62 (19) | 50 (15) | |
| 15 | 1800 | 300 (91) | 175 (53) | 112 (34) | 75 (23) | 37 (11) | 30 (9) | |
| 20 | 2400 | 225 (68) | 137 (42) | 87 (26) | 50 (15) | 30 (9) | | |
| 25 | 3000 | 175 (53) | 112 (34) | 62 (19) | 37 (11) | | | |
| 30 | 3600 | 150 (46) | 87 (26) | 50 (15) | 37 (11) | | | |
| 35 | 4200 | 125 (38) | 75 (23) | 50 (15) | | | | |
| 40 | 4800 | 112 (34) | 62 (19) | 37 (11) | | | | |
| 45 | 5400 | 100 (30) | 62 (19) | | | | | |
| 50 | 6000 | 87 (26) | 50 (15) | | | | | |

^{*}Conductor size is based on maximum 2% voltage drop

Cord Lengths for 240 Volt Loads





If unit does not have GFCI receptacles, use GFCI-protected extension cord.

| | Load (Watts) | Maximum Allowable Cord Length in ft (m) for Conductor Size (AWG)* | | | | | | |
|----------------------|--------------|-------------------------------------------------------------------|-----------|-----------|-----------|----------|----------|--|
| Current (Amperes) | | 4 | 6 | 8 | 10 | 12 | 14 | |
| 5 | 1200 | | | 700 (213) | 450 (137) | 225 (84) | 200 (61) | |
| 7 | 1680 | | 800 (244) | 500 (152) | 300 (91) | 200 (61) | 125 (38) | |
| 10 | 2400 | 800 (244) | 550 (168) | 350 (107) | 225 (69) | 125 (38) | 100 (31) | |
| 15 | 3600 | 600 (183) | 350 (107) | 225 (69) | 150 (46) | 75 (23) | 60 (18) | |
| 20 | 4800 | 450 (137) | 275 (84) | 175 (53) | 100 (31) | 60 (18) | | |
| 25 | 6000 | 350 (107) | 225 (69) | 125 (38) | 75 (23) | | | |
| 30 | 7000 | 300 (91) | 175 (53) | 100 (31) | 75 (23) | | | |
| 35 | 8400 | 250 (76) | 150 (46) | 100 (31) | | | | |
| 40 | 9600 | 225 (69) | 125 (38) | 75 (23) | | | | |
| 45 | 10,800 | 200 (61) | 125 (38) | | | | | |
| 50 | 12,000 | 175 (53) | 100 (31) | | | | | |

^{*}Conductor size is based on maximum 2% voltage drop

Hardware is common and not available unless listed.

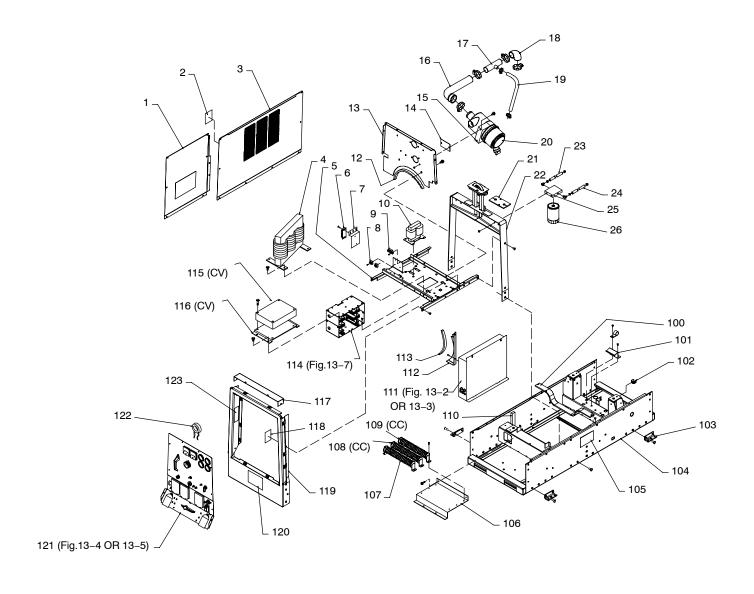


Figure 13-1. Main Assembly

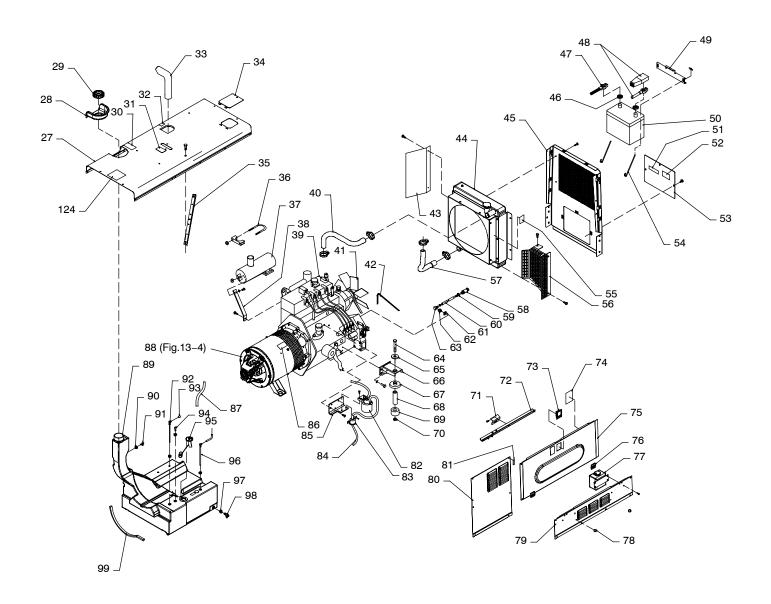


Figure 13-1. Main Assembly

Quantity

| | - I igure 10-1. Main Assembly |
|-----------------------------|-------------------------------------------------------|
| 1 189 824 | Panel, Gen Lh |
| 1 ♦199 294 | Panel, Gen Lh Ss |
| 2 200 865 | Label, CE Sound Power Level 98db (Export Models Only) |
| 3 +189 828 | Panel, Engine Side |
| 3 | Panel, Engine Side Ss |
| 4 Z1 c _c 189 395 | Reactor, Ac |
| 4 Z1 c _V 201 520 | Reactor, Ac Environmental |
| 5 206 352 | Brace, Front To Center Upright |
| 6 1T 038 621 | Block, Term 30a 4 Pole Frict Term Str |
| | Link, Jumper Term Blk 30a |
| 7 081 499 | Bracket, Mtg Strip Terminal |
| 203 260 | Label, Caution Do Not Use Ether |
| 8 SR4, SR5 . 035 704 | Rectifier, Integ Bridge 40. Amp 800v |
| 9 CB4 045 061 | Circuit Breaker, Auto Reset 24vdc 7 Amp |
| 10 T1 201 613 | Transformer W/Bracket |
| 10 T1 \$207 613 | Transformer W/Bracket (Environmental Coating) |
| 11 201 697 | Pan, Reactor And Rectifier |
| 12 173 352 | Extrusion, Rubber Clamp/Bulb (Order By Ft) |
| | Extrusion, Hubber Clamp/Duib (Order by Ft) |
| 13 | Firewall, Top |
| 14 191 307 | Cover, Plate |
| 15 189 763 | Bracket, Mtg Air Cleaner |
| 16 218 048 | Hose, Air Cleaner |
| 17 218 047 | Tube, Air Intake |
| 18 | Hose, Air Cleaner |
| 010 863 | Clamp, Hose 1.125 – 3.000 Clp Dia |
| 19 220 091 | Hose, Sae .500 ld X .750 Od X 13.000 |
| 20 | Air Cleaner, Intake |
| *192 938 *• 192 939 | Filter, Air Element Primary |
| 21 189 464 | Seal, Weather Lift Eye |
| | Hose, Sae .312 ld X .560 Od X 24.000 (Order By Ft) |
| 22 201 658 | Upright, Center Assembly |
| 23 191 819 | Hose, Sae .312 ld X .560 Od X 14.000 (Order By Ft) |
| | Hose, Sae .312 ld X .560 Od X 5.000 (Order By Ft) |
| 24 095 636 | Hose, Sae .187 ld X .41 Od X 30.000 (Order By Ft) |
| 25 206 297 | Base, Fuel Filter W/Fittings |
| 26 | Filter, Fuel Spin-on |
| 27 +201 934 | Cover, Top |
| | Cover, Top Ss |
| 28 | Grommet, Plastic Neck Filler Fuel |
| 29 190 198 | Cap, Tank Screw-on 3.500 In W/Vent |
| | Label, Use Diesel Fuel Only |
| 31 222 513 | Label, Warning Falling Equipment Can Cause Serious |
| 32 224 265 | |
| 33 105 734 | |
| 34 201 851 | |
| 34 | |
| 35 191 354 | |
| 35 \$202 633 | |
| 36 010 875 | Clamp, Muffler 2.000 Dia |
| 37 215 345 | |
| 38 | |

Figure 13-1. Main Assembly (Continued)

| . 39 | 237 011 Engine, Perkins Dsl Elec 404D-22T-W ZA005 |
|------|--------------------------------------------------------------------------------------|
| | *214 931 Sender, Coolant Temp & 110c N.o. Switch |
| | *215 094 Switch, Oil Pressure |
| | 023 562 Clamp, Hose .312 – .875 Clp Dia |
| | *197 899 Filter, Oil |
| | *192 744 Filter, Fuel Spin–on |
| | *197 997 Filter, Fuel Secondary |
| | 214 658 Hose, Radiator Upper |
| | 218 273 Fan, Engine Cooling 15.350 Blower |
| | *197 944 Belt, Fan |
| | , |
| | 202 017 . Guard, Belt |
| . 44 | |
| | 220 281 Shroud, Radiator |
| | 214 884 Radiator, W/14# Cap 4 Row Core 3 Pass |
| | 187 120 Cap, Radiator Pressure 14 Lb |
| | 201 749 Upright, Rear |
| | \$207 188 Upright, Rear Ss |
| | \$ 207 005 Grill, Rear Panel Ss |
| 46 | 108 081 Terminal Protector, Battery Post Mtg |
| | 190 206 Cable, Bat Neg 42 In Lg No. 2 Awg W/Clamp And .375rng |
| | 190 207 Cable, Bat Pos 45 In Lg No. 1 Awg W/Clamp And .406rng |
| | 203 430 Bracket, Battery Holddown |
| | 190 897 Battery, Stor 12v 650crk 110rsv Gp 24 |
| | 225 120 Label, Warning Moving Parts Can Cause Injury |
| | |
| | |
| | +201 183 Cover, Battery Access |
| | +202 639 Cover, Battery Access Ss |
| | 201 006 Bolt, J Stl .312–18 X 8.500 Pld |
| | 225 120 Label, Warning Moving Parts Can Cause Injury |
| | +215 006 Guard, Fan |
| | 197 496 Hose, Radiator Lower |
| | 199 505 Hose, Oil Drain Assy 32 In (Consisting Of) |
| | 165 271 Valve, Oil Drain 3/8–18nptf |
| 59 | 176 529 Fitting, Hose Brs Barbed Fem 1/2tbg X 3/8npt |
| | 113 854 Hose, Sae .500 ld X .780 Od Xc Oil (Order By Ft) |
| | Washer, Oil Drain (Available Through Engine Manufacturer) |
| | 197 196 . Fitting, Adapter Oil Drain 12mm Male X 3/8 Npt Female |
| | 197 448 Fitting, Hose Brs Barbed Elbow M 1/2 Tbg X 3/8 Npt |
| | 199 849 Screw, 625–11 X 4.00hexhd Pln Gr 5 Pld |
| | 071 731 Washer, Flat .656 ld X 2.250 Od X .187t Stl Pld |
| . 66 | |
| | |
| 66 | |
| 67 | |
| . 68 | |
| . 69 | , O, I |
| . 70 | 135 205 Nut, 625–11 .94hex .76h Stl Pld Elastic Stop Nut |
| . 71 | 190 992 Keeper, Latch Engine Access Door |
| . 72 | · · · · · · · · · · · · · · · · · · · |
| . 72 | \$202 635 Channel, Stiffener Engine Access E-coat |
| | 199 592 Latch, Paddle Series 20 (Black) |
| | 220 539 Label, Maintenance Big Blue Perkins Series |
| . 74 | 555 ii Labon inamenanee big bide i entine eenee iii ii |
| | +200 989 Door Engine Access |
| . 75 | +200 989 Door, Engine Access |

Figure 13-1. Main Assembly (Continued)

Quantity

| 77 190 190 | Tank, Coolant Recovery |
|------------------------------------------|----------------------------------------------------------------|
| 78 208 141 | |
| 79 189 826 | |
| | Panel, Rocker Ss |
| | Panel, Gen Rh |
| | Panel, Gen Rh Ss |
| | Bumper, Door Engine Access |
| | Filter, Fuel Secondary |
| 83 | |
| | Hose, Sae .312 ld X .560 Od (Order By Ft) |
| | |
| | Bracket, Mtg Fuel Filter/Pump |
| | |
| | Hose, Sae .187 ld X .410 Od X 30.000 (Order By Ft) |
| 88 Figure 13-6 | |
| | Tank, Fuel (Consisting Of) |
| 90 124 253 | Bushing, Tank Fuel |
| | Clamp, Hose .460 – .545clp Dia Slfttng |
| | Fitting, Stl Barbed Elbow W/.047 In Orf Zinc Pld |
| 92 189 909 | Fitting, Stand Pipe Hose .250 X 9.260 Lg 90deg Zinc 1 |
| 93 201 025 | Cap, Fuel Fitting |
| | Fitting, Stl Barbed Elbow Zinc Pld |
| | Sender, Fuel Gauge 9.7500 Deep Tank |
| | Fitting, Stand Pipe Hose .3125 X 9.260 Lg 90deg Zinc 1 |
| | Bushing, Tank Fuel 1 |
| | Valve, Drain Fuel 180deg 1 |
| | Extrusion, Rubber W/Adhesive 1.000 X 1.000 D (Order By Ft) 6ft |
| 100 218 086 | , |
| 101 196 220 | Bracket, Hold Down Fuel Tank Rear 1 |
| 102 192 362 | Bracket, Mtg Nyl 1/2 Conduit |
| 103 191 897 | Bracket, Mtg Unit 4 |
| 104+200 999 | Base 1 |
| 106 ♦+203 382 | Base E-coat |
| 105 224 266 | Label, Warning Do Not Weld On Base |
| 106 190 179 | Bracket, Mtg Resistor 1 |
| 107 R3 189 699 | Resistor, Ww Tap 375w 10 Ohm W/Mtg Bkt |
| 108 R2 ^c _c 189 699 | Resistor, Ww Tap 375w 10 Ohm W/Mtg Bkt 1 |
| 109 R4 ^c c191 292 | Resistor, Ww Fxd 375 W 50 Ohm W/Mtg Bkt |
| 110 191 446 | Extrusion, Rubber W/Adhesive 1.000 X 1.000 D (Order By Ft) 6ft |
| 111 Figures 13-2, 13-3 | Control Box Assembly 1 |
| 112 189 731 | Firewall, Lower 1 |
| 113 173 352 | Extrusion, Rubber Clamp/Bulb (Order By Ft) 3ft |
| 114 Figure 13–7 | Main Rectifier Assembly 1 |
| 115 PC1 c _v 207 397 | Module, Field Current Regulator |
| 116 | Bracket, Mtg Box Fcr 1 |
| 117 191 448 | Top, Cover Front Upright |
| 119 ♦ 199 305 | Top, Cover Front Upright Ss 1 |
| 118 | Not Applicable |
| 119 +201 750 | Upright, Front |
| 121 | Upright, Front Ss |
| | Label, Warning General Precautionary Csa |
| 121 Figures13-4, 13-5 | Panel, Front W/Components |
| 173 216 | · |
| 122 202 130 | Xfmr, Current Sensing |
| | , |

| Item | Dia. | Part | | |
|------|-------|------|-------------|----------|
| No. | Mkas. | No. | Description | Quantity |

Figure 13-1. Main Assembly (Continued)

| 123 | 212 944 | Label, Weld Control/Arc Condition Information Label |
|-----|---------|----------------------------------------------------------------------------|
| 124 | 233 088 | Label, Danger Using A Generator Indoors Can Kill You In Minutes (Unit) 1 |
| | 190 058 | Nut, .250–20 U–nut Multi–thread |
| | 049 525 | Nut, 312–18 U–nut Multi–thread |
| | 237 013 | Label, Hour/Fuel Meter Usage |
| | 216 136 | Kit, Label (Includes Safety & Informational Labels) (CC Models) 1 |
| | 216 135 | Kit, Label (Includes Safety & Informational Labels) (CC/CV Models) 1 |
| | 216 993 | Kit, Label (Includes Safety & Informational Labels) (CC Export Models) . 1 |
| | | Kit, Label (Includes Safety & Informational Labels) (CC/CV Export Models)1 |

⁺ When ordering a component originally displaying a precautionary label, the label should also be ordered. *Recommended Spare Parts.

c_c CC models only.

c_V CC/CV models only.

[♦] Optional

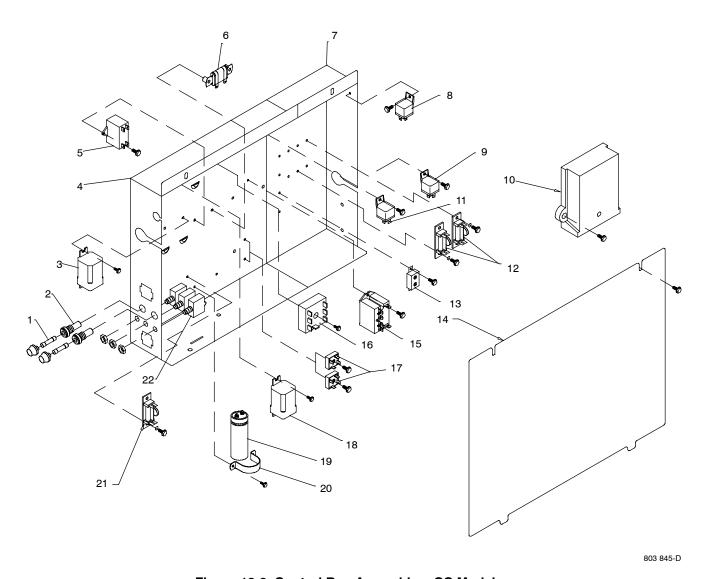


Figure 13-2. Control Box Assembly – CC Models

Figure 13-2. Control Box Assembly – CC Models (Figure 13-1 Item 111)

| 1 F1, F2 *085 874 FUSE, mintr cer slo-blo 10A 250V | 2 |
|----------------------------------------------------------------------------|----------|
| 2 046 432 HOLDER, fuse mintr .250 x 1.250 2 | <u> </u> |
| 3 CR7 188 636 RELAY, OCV control | |
| 4 | |
| 5 R6 141 424 RESISTOR, ww fxd 30 w 25 ohm faston te | |
| 6 C12 191 944 CAPACITOR, polyp met film 10. uf 250 vac 10% | |
| 7 | |
| 8 CR8 197 325 RELAY, encl 12vdc spst 70a 4pin flange mtg | |
| 9 CR1 090 104 RELAY, encl 12vdc spst 30a/15vdc 5pin flange mtg | |
| 10 Engine Controller 219 848 MODULE, control governor 1 | |
| LE3 204 702 CORE, torodial .187 id x .375 od x .125 thk | |
| 11 CR6 • 090104 RELAY, encl 12vdc spst 30a/15vdc 5pin flange mtg | |
| 12 D10/C10, D12 189 701 DIODE/CAPACITOR BOARD | |
| 13 CB10 190 374 CIRCUIT BREAKER, Auto Reset 12vdc 40 Amp | |
| 14 | |
| 15 CR5 223 710 RELAY, Encl 12vdc Dpst-no 25a 6pin Flange | |
| 16 PC7 ♦ 195 706 MODULE, pull to idle, two output, 7 pin | |
| 17 SR1, SR2 . 035 704 RECTIFIER, integ 40A 800V | |
| 18 CR4 ♦ 113 247 RELAY, encl 12vdc dpdt 20a/120vac 8pin flange mtg | |
| 19 C9 087 110 CAPACITOR, elctlt 240uf 200VDC | |
| 20 | |
| 21 D1/C1 189 701 DIODE/CAPACITOR BOARD | |
| 22 CB11, 12, 13 139 266 SUPPLEMENTARY PROTECTOR, man reset 1P 15A 250VAC 3 | |
| ♦ Optional | • |

[♦] Optional

^{*}Recommended Spare Parts.

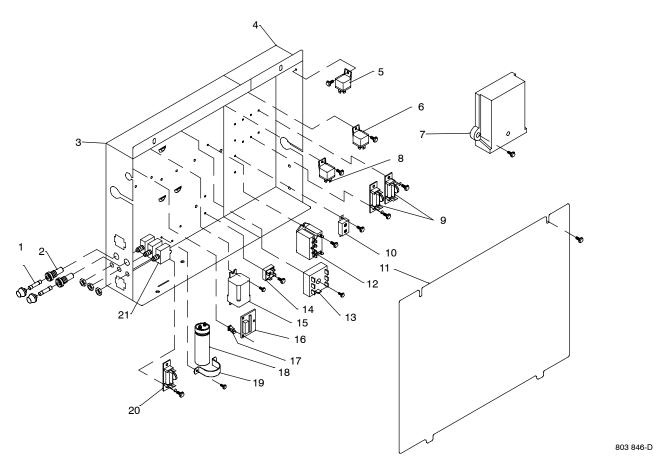


Figure 13-3. Control Box Assembly - CC/CV Models

| Item Dia. No. Mkgs. | Part No. | Description | Quantity |
|------------------------|-------------------------|---------------------------------------------------------------|-----------------------------------|
| | Figure 13-3 | 3. Control Box Assembly - CC/CV Models (Figure 13-1 Item 111) | |
| 2 | 046 432 201 077 201 078 | CIRCUIT BREAKER, Auto Reset 12vdc 40 Amp | 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 |

^{*}Recommended Spare Parts.

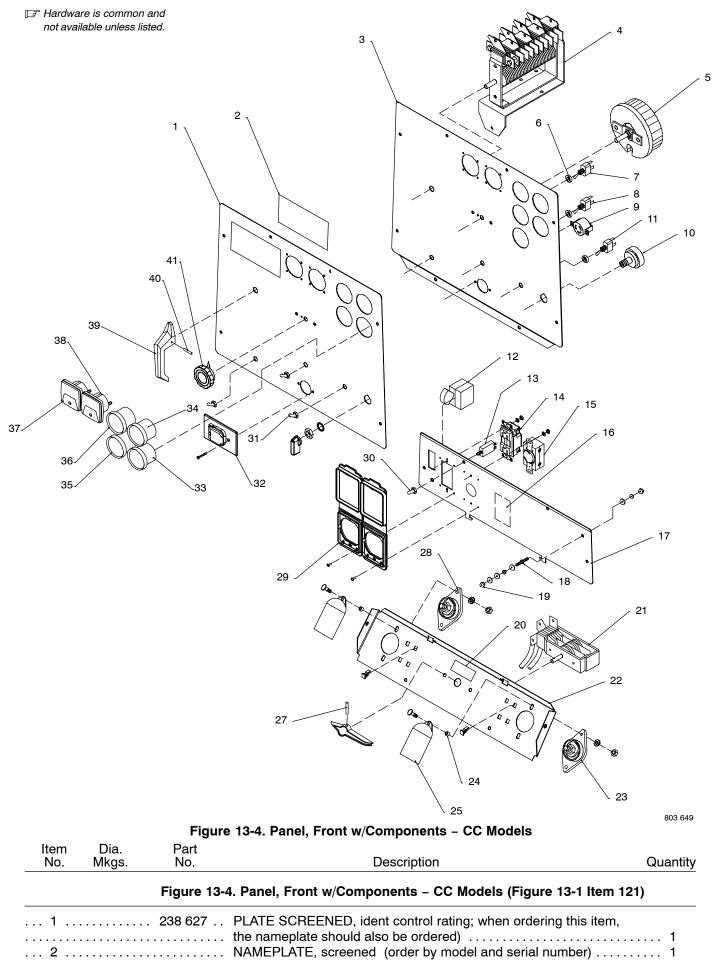


Figure 13-4. Panel, Front w/Components - CC Models (Continued)

| | Figure 13- | 4. Panel, Front w/Components – CC Models (Continued) |
|------|------------|----------------------------------------------------------|
| 3 | 238 616 | PANEL, engine/weld control |
| | | SWITCH, range/changeover 1 |
| | | RHEOSTAT, WW 300W 34 ohm |
| | | SPACER, nylon |
| 7 S6 | 011 622 | SWITCH, tgl DPDT 15A 125VAC |
| | | SWITCH, tgl SPDT 15A 125VAC on-none-on spd term chr |
| | | RECEPTACLE, twlk grd 2P3W 15A 125V |
| | | SWITCH, ignition 4 position w/out handle |
| | | LEVER, ignition switch |
| | | WASHER, tooth.728idx1.166odx.050t stl pld int.688 |
| | | SWITCH, tgl spst 3a 250v off-none-(on) spd term |
| | | AUXILIARY POWER GROUP, Export |
| | | AUXILIARY POWER GROUP, Domestic (Includes) |
| | | CLIP, circuit breaker retaining |
| | | SUPPLEMENTARY PROTECTOR, man reset 2P 20 A, 250VAC 1 |
| | | SUPPLEMENTARY PROTECTOR, man reset 1P 20A 250VAC frict 3 |
| | | RECEPTACLE, str dx grd 2P3W 15/20A 125V GFCI |
| | | RECEPTACLE, tw lk grd 2P3W 30A 250V L6-30R |
| | | LABEL, warning electric shock and moving parts etc |
| | | PANEL, gen pwr |
| 17 | ±215 047 | PANEL, gen pwr ss 1 |
| 18 | 083 030 | STUD, brs .250–20 x 1.750 w/hex collar |
| | | NUT, 250–20 .50hex .19h brs |
| | | COVER, receptacle w/gasket |
| | | BOOT, circuit breaker clear hex nut |
| | | LABEL, do not switch while welding |
| | | SWITCH, polarity |
| | | PANEL, mtg terminal pwr output |
| | | PANEL, mtg terminal pwr output ss |
| | | TERMINAL, pwr output black |
| | | WASHER, output stud |
| | | SPACER, output stud |
| | | BOOT, generic output stud |
| | | HANDLE, switch |
| | | PIN, spring cs .156 x 1.250 |
| | | TERMINAL, pwr output red |
| | | BOOT, toggle switch lever |
| | | COVER, receptacle twistlock |
| 33 | | |
| | | GAUGE, fuel elec/hour meter |
| 35 | 217 084 | GAUGE, Coolant Temp 0 – 300 Deg F Electric |
| | | |
| 36 | | GAUGE, Pressure Oil 0–100 Psi Electric |
| | | SENDER, Pressure Oil 0–100 Psi |
| | | VOLT METER, W/Leads |
| | | AMMETER, W/Leads |
| | | HANDLE, switch range |
| 40 | | PIN, spring CS .156 x 1.250 |
| 40 | | |
| | | KNOB, pointer |
| | 024 103 | DLAINT, SHAP-III TIYI ./ 30 ITILY HOLE DIACK |

◆ Optional

⁺ When ordering a component originally displaying a precautionary label, the label should also be ordered.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

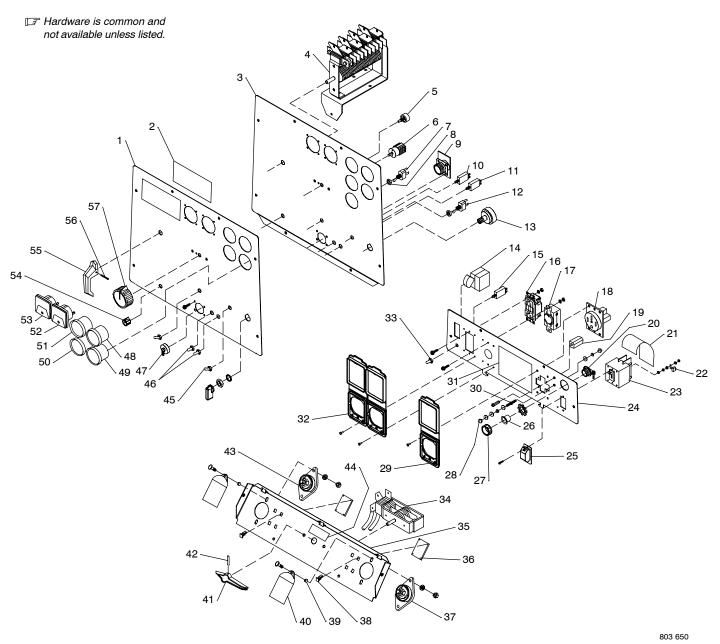


Figure 13-5. Panel, Front w/Components - CC/CV Models

| ltem | Dia. | Part | | |
|------|-------|------|-------------|----------|
| No. | Mkgs. | No. | Description | Quantity |

| Figure 13-5. | Danel | Front w/C | omponente | CC/CV Ma | dale / | (Eiguro : | 12_1 | ltom | 121\ | |
|--------------|--------|-----------|-------------|--------------|---------|-----------|---------------|------|------|--|
| ridure 13-3. | Panei. | From w/G | ombonents – | · CC/CV IVIO | oueis i | iriaure | 1 3 -1 | цет | 121) | |

| 1 | 1 |
|-------------------------------------------------------------------------|---|
| | |
| 3 | |
| 4 S3 208 278 SWITCH, range/changeover 1 | |
| 5 R1 193 118 POT, cp flat 1t 2w 1k ohm linear 1 | 1 |
| 6 S6 193 234 SWITCH, rotary 6 position gold contacts | 1 |
| 197 527 GUARD, circuit breaker (For S6 – Not Included w/Harness) 1 | 1 |
| 7 S5 011 609 SWITCH, tgl SPDT 15A 125VAC on-none-on spd term chr 1 | 1 |
| 8 202 209 SPACER, nylon 2 | 2 |
| 9 PC6 192 995 CIRCUIT CARD ASSY, connector/receptacle | 1 |
| 10 CB5 139 266 SUPPLEMENTARY PROTECTOR, man reset 1p 15a 250vac frict 1 | |
| 11 CB6 083 432 SUPPLEMENTARY PROTECTOR, Man Reset 1p 10a 250vac Frict 1 | 1 |

| Figure 1 | 3-5. Panel, Front w/Components – CC/CV Models (Continued) |
|------------------|-----------------------------------------------------------|
| 12 S2 021 467 | SWITCH, tgl spst 3a 250v off-none-(on) spd term |
| | SWITCH, ignition 4posn w/o handle |
| | LEVER, ignition switch |
| 201 244 | WASHER, tooth.728idx1.166odx.050t stl pld int.688 |
| | AUXILIARY POWER GROUP , Export |
| | AUXILIARY POWER GROUP, Domestic (Includes) |
| | SUPPLEMENTARY PROTECTOR, man reset 2P 20 A, 250VAC 1 |
| | CLIP, circuit breaker retaining |
| 15 CB2 093 996 | SUPPLEMENTARY PROTECTOR, man reset 1P 20A 250VAC frict 1 |
| | RECEPTACLE, str dx grd 2P3W 15/20A 125V GFCI |
| | RECEPTACLE, tw lk grd 2P3W 30A 250V L6-30R 1 |
| | RCPT, str 3P4W 50A 125/250V 1 |
| | STAND-OFF, insul .250-20 x 1.2 |
| 20 ♦ 604 102 | CONNECTOR, clamp cable 1.000 |
| 21 ♦ 197 527 | GUARD, circuit breaker 1 |
| 22 ♦ 197 363 | TERMINAL, ring tng screw clamp 3 |
| 23 CB7 ♦214 926 | SUPPLEMENTARY PROTECTOR, man reset 3p 1 |
| 24 +215 347 | PANEL, generator power 1 |
| 24 \$215 406 | PANEL, generator power ss |
| 24 + ♦ 215 363 | PANEL, generator power (full kVA option) |
| 25 ♦214 927 | BOOT, circuit breaker 1 pole 1 |
| | PLUG, protective 1 |
| | BUSHING, conduit 1 in 1 |
| | NUT, 250–20 .50hex .19h brs |
| | COVER, receptacle w/gasket |
| | STUD, brs .250-20 x 1.750 w/hex collar 1 |
| | TRANSFORMER, current sensing |
| | LABEL, warning electric shock and moving parts etc |
| 31 ♦ 197 399 | LABEL, warning 3 ph generator power |
| 32 209 056 | COVER, receptacle w/gasket |
| | BOOT, circuit breaker clear hex nut |
| 34 \$12 ♦195 825 | SWITCH, polarity 1 |
| | SWITCH, polarity/AC 1 |
| | PANEL, mtg terminal pwr output |
| | PANEL, mtg terminal pwr output ss |
| • | CIRCUIT CARD ASSEMBLY, filter hf |
| 37 039 046 | · · · = · · · · · · · · · · · · · · · · |
| | WASHER, output stud |
| | STAND-OFF, support |
| 40 186 621 | · · · |
| 41 \$ 059 773 | HANDLE, switch |
| 42 \$010 647 | · |
| 43 039 047 | |
| 44 \$ 196 073 | |
| 45 021 385 | |
| 46 190 323 | |
| 47 170 391 | |
| | GAUGE, fuel elec/hour meter |
| 49 \$ 193 228 | |
| | GAUGE, Coolant Temp 0– 300 Deg F Electric |
| | SENDER, Coolant Temp 300 Deg F M16 X 1.5 |
| | GAUGE, Pressure Oil 0–100 Psi Electric |
| | SENDER, Pressure Oil 0 – 100 Psi |
| 52 \$ 164 873 | |
| 53 \$ 164 874 | , , , |
| | KNOB, pointer .875 dia x .250 ID w/set screws plstc 1 |

Figure 13-5. Panel, Front w/Components - CC/CV Models (Continued)

| 55 | 189 161 HANDLE, switch range 1 |
|----|---------------------------------------------------------------|
| 56 | 010 647 PIN, spring CS .156 x 1.250 1 |
| 57 | 097 924 KNOB, pointer 1.625 dia x .250 ID w/set scrws plstc 1 |
| | 024 103 BLANK, snap-in nyl .750 mtg hole blk 1 |
| | 120 304 BLANK, snap-in nyl .250 mtg hole black |

⁺ When ordering a component originally displaying a precautionary label, the label should also be ordered.

Itam

Dia

Part

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

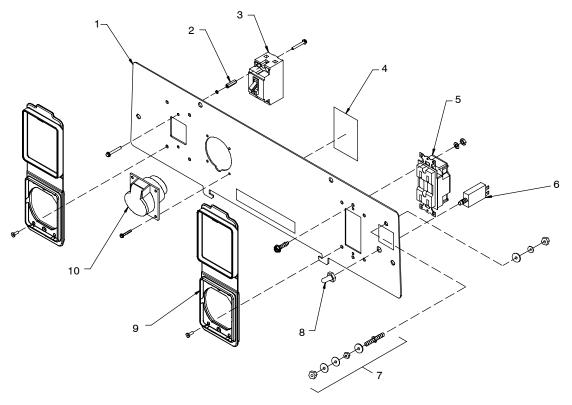


Figure 13-6. Auxiliary Power Group, Export

| No. | Mkgs. | No. | Description | Quantity |
|---------|--------------|------------|------------------------------------------------------------------------------|----------|
| | | | 13-6. Auxiliary Power Group, Export | |
| 1 | | +223121 . | . Panel, Aux Power (Export) | 1 |
| 2 | | . 144844 . | . Stand-off, No 6-32 X .875 Lg .250 Hex Al Fem | 2 |
| 3 | . ELCB1 . | . 222991 . | . Circuit Breaker, Elcb 20a 220v 0.030a Trip | 1 |
| 4 | | . 200910 . | . Label, Warning Electric Shock And Moving Parts Ce | 1 |
| 5 | . GFCI1 . | . 151981 . | . Rcpt, Str Dx Grd 2p3w 15/20a 125v *5–20r Gfi | 1 |
| 6 | CB2 | . 093996 . | . Circuit Breaker, Man Reset 1p 20a 250vac Frict | 1 |
| 7 | | . 083030 . | . Stud, Brs .250-20 X 1.750 W/Hex Collar | 1 |
| | | . 601836 . | . Nut, 250–20 .50hex .19h Brs | 3 |
| 8 | | . 190323 . | . Boot, Circuit Breaker Clear Hex Nut | 1 |
| 9 | | . 209056 . | . Cover, Receptacle W/Gasket | 2 |
| 10 | RC1 | . 176355 . | . Rcpt, Str 2p3w 16a 220v Flange Mtg | 1 |
| +When d | rdering a co | mponent or | iginally displaying a precautionary label, the label should also be ordered. | |

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

805 259-A

[♦] Optional

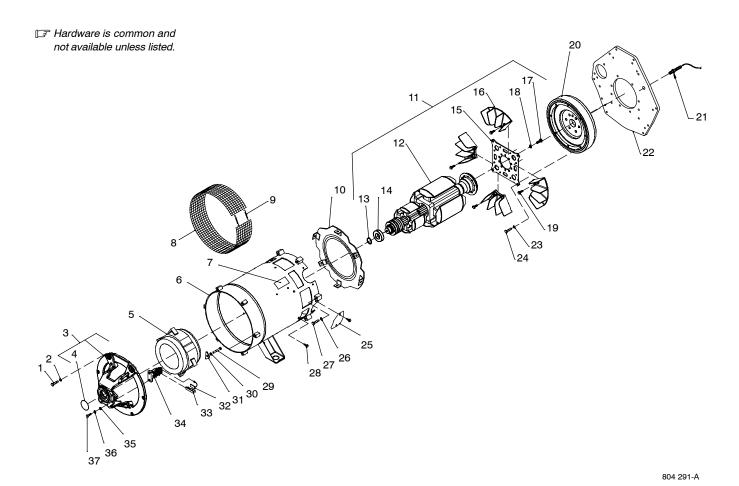


Figure 13-7. Generator

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|-------------|---------------|-------------|----------------------------------------------------------------------------|----------|
| | <u> </u> | | Figure 13-7. Generator (Figure 13-1 Item 88) | |
| | | | SCREW, .375–16x1.50 hex hd-pln gr5 pld | |
| 3 | | 195 911 | WASHER, conical spring .406 ID x .875 OD pltd ENDBELL, gen (consisting of) | 1 |
| | | | O-RING, 2.859 ID x .139CS | |
| 6 | | +208 287 | STATOR, weld assembly complete | 1 |
| 7 | | . 225 120 | LABEL, warning moving parts can cause injury | 2 |
| 9 | | . 172 674 | GUARD, generator wire mesh | 2 |
| | | | BAFFLE, air | |
| 12 | | . 210 446 | ROTOR, Generator (Includes) | 1 |
| 14 | | . 053 390 | BEARING, Ball Rdl Sgl Row 1.370 X 2.830 X .6 | 1 |
| | | . 210 447 | HUB, Drive (Not Sold Separately) | 1 |
| | | | PLATE, Flex Hubmount FAN, Rotor Segmented Assy Gen | |
| | | | SCREW, M10–1.5x 25 Hex Hd–pln 8.8 Pln | |

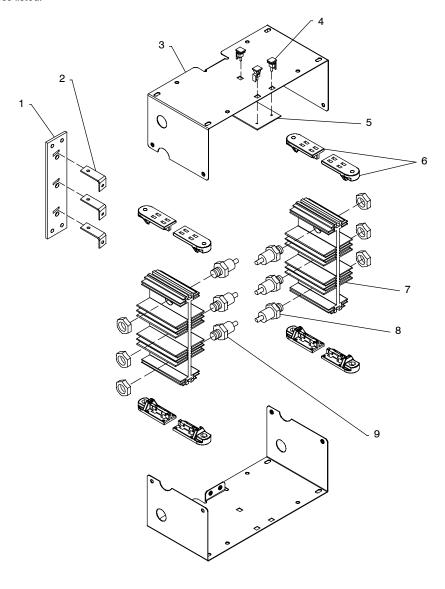
| Item | Dia. | Part | | |
|------|-------|------|-------------|----------|
| No. | Mkgs. | No. | Description | Quantity |

Figure 13-7. Generator (Continued)

| 18 | 083 883 | WASHER, Lock .402idx0.709odx.087t Stl Split10mm | 10 |
|----|---------|------------------------------------------------------|----|
| 19 | 080 389 | SCREW, 312-18x1.00 Hexwhd.66d Stl Pld Slffmg Tap-rw | 8 |
| | | . FLYWHEEL | |
| 21 | 221 916 | SENSOR, Speed (Magnetic) 5/8-18 | 1 |
| | | ADAPTER, Engine | |
| | | WASHER, Lock .402idx0.709odx.087t Stl Split10mm | |
| 24 | 049 026 | SCREW, M10–1.5x 25 Hex Hd–pln 8.8 Pln | 4 |
| 25 | 191 579 | COVER, starter hole /Continental | 2 |
| | 195 560 | GUARD, starter hole deutz 912 | 1 |
| 26 | 083 883 | WASHER, Lock .402idx0.709odx.087t Stl Split10mm | 6 |
| 27 | 172 555 | SCREW, M10-1.5 x 50hexhd pln 8.8pld | 6 |
| 28 | 602 159 | SCREW, .312-18x .75 hexwhd.66d stl pld slffmg tap-rw | 6 |
| 29 | | SCREW, .312-18 x 2.25hexhd pln gr 5pld | |
| | | WASHER, lock .318 ID x 0.586 | |
| | | WASHER, exciter | |
| 32 | | BRUSH, contact | |
| 33 | 208 469 | CLIP, spring | 3 |
| 34 | 189 142 | BRUSHHOLDER ASSEMBLY, gen | 1 |
| 35 | 602 242 | WASHER, flat .375IDx0.875odx.083t stl pld | 2 |
| | | WASHER, Lock .318idx0.586odx.078t Stl Pld Split.312 | |
| 37 | | SCREW, .312–18x1.25 hex hd–pln gr5 pld | |
| | | | |

⁺ When ordering a component originally displaying a precautionary label, the label should also be ordered. *Recommended Spare Parts.

♦ Optional



802 279-A

Figure 13-8. Main Rectifier Assembly

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|-------------|---------------|-------------|-------------------------------------------------------------|----------|
| | | | Figure 13-8. Main Rectifier Assembly (Figure 13-1 Item 114) | |
| | SR3 | 215 910 | RECTIFIER, environmental (consisting of) | 1 |
| | | | . CONNECTION BOARD, rectifier AC | |
| 2 | | 188 517 | . BUS BAR, connection board | 3 |
| 3 | | 188 135 | . ENCLOSURE, rectifier | 2 |
| 4 | | 134 201 | . STAND-OFF, support | 3 |
| | | | . CIRCUIT CARD ASSEMBLY, protection | |
| | | | . INSULATOR, heat sink | |
| 7 | | 188 493 | . HEAT SINK, rectifier al | 2 |
| 8 . | D3, D5, D7 | 208 334 | . DIODE, rect 275A 300V SP | 3 |
| 9 . | D2, D4, D6 | 208 335 | . DIODE, rect 275A 300V RP | 3 |

Some wiring harness components (switches, relays, circuit breakers) are also referenced elsewhere in this parts list. Purchase components separately or as part of the associated wiring harness.

Item Dia. Part
No. Mkgs. No. Description Quantity

Wiring Harnesses

| Wiring Harnesses | | | |
|---------------------|----------------------------------------------------------------------|--|--|
| 221374 | . Harness, Engine (Includes) 1 | | |
| D10/C10 189701 | . Diode/Capacitor Board, | | |
| CB10 190374 | . Circuit Breaker, Auto Reset 12vdc 40 Amp 1 | | |
| | . Nut, 010–32 .31hex .13h Stl Pld Sem Cone Wshr.38d | | |
| CR1 090104 | . Relay, Encl 12vdc Spst 30a/15vdc 5pin Flange Mtg 1 | | |
| | . Harness, Governor Control 404.22t | | |
| | Conn, Deutsch Dtm 12p 2row Plug 'a' 1 | | |
| | Conn, Deutsch Dtm Wedge Lock 12 Position | | |
| | Conn, Deutsch 2p 1row Female Plug 1 | | |
| | Conn, Deutsch Wedge Lock 2 Position | | |
| | Core, Toroidal .187 ld X .375 Od X .125 Thk | | |
| | . Conn, Deutsch Dtm 12p 2row Plug 'b' | | |
| | . Conn, Deutsch Dtm Wedge Lock 12 Position 1 | | |
| | . Conn, Deutsch 2p 1row Female Plug | | |
| | . Conn, Deutsch Wedge Lock 2 Position | | |
| | . Relay, Encl 12vdc Spst 70a 4pin Flange Mtg 1 | | |
| 204702 | . Core, Toroidal .187 ld X .375 Od X .125 Thk | | |
| | . Harness, Range Switch (Includes) 1 | | |
| | . Conn, Rect Univ 084 4p/S 1row Rcpt Cable/Panel Lkg (Service Kit) 1 | | |
| | | | |
| | . Harness, Wrg, Brushholder (Includes) 1 | | |
| | . Conn, Rect Univ 084 9p/S 3row Plug Cable Lkg (Service Kit) | | |
| | . Seal, Wire Univ 9p/S 3row | | |
| 215013 | . Harness, Unit Weld Control CC (Includes) | | |
| | Conn, Rect Univ 084 12p/S 3row Plug Cable Lkg | | |
| | Seal, Wire Univ 12p/S 3row | | |
| | Conn, Rect Univ 084 4p/S 1row Plug Cable Lkg | | |
| | | | |
| | . Harness, Control Box CC (Includes) 1 | | |
| SR1, SR2 035704 | | | |
| D1/C1 189701 | | | |
| | . Conn, Rect Univ 084 15p/S 3row Rcpt Cable/Panel Lkg 1 | | |
| CB11, 12, 13 139266 | . Supplementary Protector, Man Reset 1p 15a 250vac | | |
| CR7 188636 | | | |
| | . Socket, Relay 5 Pin | | |
| | . Switch, Tgl 3pdt 15a 125vac On-none-on Spd Term 1 | | |
| | . Switch, Tgl Spdt 15a 125vac On-none-on Spd Term Chr 1 | | |
| | Conn, Pack 4p 1row Female | | |
| | Conn, Pack Terminal Position Assurance(Lock) | | |
| | Switch, Tgl Spst 3a 250v Off–none–(On) Spd Term | | |
| | Conn, Rect Univ 039 6p/S 3row Plug Cable Lkg | | |
| | Conn, Rect Univ 084 3p/S 1row Plug Cable Lkg | | |
| | Conn, Rect Univ 084 12p/S 3row Rept Cable/Panel Lkg | | |
| | Conn, Rect Univ 084 9p/S 3row Rcpt Cable/Panel Lkg | | |
| | . Conn, rect univ 039 8p/s 2row plug cable lkg seal | | |

| 215207 | ٠ | Harness, Unit Weld Control CV (Includes) | 1 |
|---------------------|---|---------------------------------------------------------|---|
| PLG6 114063 | ١ | Conn, Rect Univ 084 4p/S 1row Plug Cable Lkg | 1 |
| 193184 | | Conn, Rect Cinch 30 Pin | |
| 147992 | | Conn, Rect Univ 039 10p/S 2row Plug Cable Lkg | 1 |
| PLG3 158465 | | Conn, Rect Univ 084 12p/S 3row Plug Cable Lkg | |
| | | Seal, Wire Univ 12p/S 3row | |
| | | Plug, Cavity 18,30 Position Cinch Connector | 7 |
| | | 3 | |
| 238683 | | Harness, Control Box, CC/CV (Includes) | 1 |
| CB11, 12, 13 139266 | i | Supplementary Protector, Man Reset 1p 15a 250vac | 3 |
| SR1 035704 | ٠ | Rectifier, Integ Bridge 40. Amp 800v | 1 |
| | ١ | Socket, Relay 5 Pin | 1 |
| RC4 047483 | ١ | Conn, Rect Univ 084 15p/S 3row Rcpt Cable/Panel Lkg | 1 |
| RC3 158466 | | Conn, Rect Univ 084 12p/S 3row Rcpt Cable/Panel Lkg | |
| RC1 135133 | | Conn, Rect Univ 084 9p/S 3row Rcpt Cable/Panel Lkg | |
| | i | Conn, Rect Univ 039 6p/S 3row Plug Cable Lkg | 5 |
| S6 193234 | ٠ | Switch, Rotary 6 Posn Gold Contacts | 1 |
| 021467 | ٠ | Switch, Tgl Spst 3a 250v Off-none-(On) Spd Term | 1 |
| S5 011609 | | Switch, Tgl Spdt 15a 125vac On-none-on Spd Term Chr | 1 |
| D1/C1 189701 | | Diode/Capacitor Board, | 1 |
| | | Conn, Rect Cinch 18 Pin | |
| | | Plug, Cavity 18,30 Position Cinch Connector | 4 |
| | | Seal, Switch 6 Position Rotary .250 Shaft | |
| 141450 | | Conn, Rect Metrmate 10skt 1row Plug Cable Lkg | |
| | | Circuit Breaker, Man Reset 1p 15a 250vac Frict | |
| 211292 | | Conn, Pack 4p 1row Female | |
| 211293 | | Conn, Pack Terminal Position Assurance (Lock) | |
| 214932 | | Conn, rect univ 039 8p/s 2row plug cable lkg seal | 1 |
| | | | |
| 201109 | | Harness, Receptacle Auxiliary Power Domestic (Includes) | |
| RC1 147632 | | Rcpt, Tw Lk Grd 2p3w 30a 250v *L6-30r | |
| GFCI1 151981 | | Rcpt, Str Dx Grd 2p3w 15/20a 125v *5-20r Gfi | |
| CB2 093996 | | Supplementary Protector, Man Reset 1p 20a 250vac Frict | |
| 223132 | | Harness, Receptacle Auxiliary Power Export (Includes) | |
| GFCI1 151981 | | Rcpt, Str Dx Grd 2p3w 15/20a 125v *5-20r Gfi | |
| CB2 093996 | i | Supplementary Protector, Man Reset 1p 20a 250vac | 1 |

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- 1. 5 Years Parts 3 Years Labor
 - Original main power rectifiers only to include SCRs, diodes, and discrete rectifier modules
- 2. 3 Years Parts and Labor
 - * Transformer/Rectifier Power Sources
 - * Plasma Arc Cutting Power Sources
 - * Process Controllers
 - * Semi-Automatic and Automatic Wire Feeders
 - * Inverter Power Sources (Unless Otherwise Stated)
 - * Water Coolant Systems (Integrated)
 - * Intellition
 - Engine Driven Welding Generators (NOTE: Engines are warranted separately by the engine manufacturer.)
- 3. 1 Year Parts and Labor Unless Specified
 - * Motor Driven Guns (w/exception of Spoolmate Spoolguns)
 - * Positioners and Controllers
 - * Automatic Motion Devices
 - * RFCS Foot Controls
 - * Induction Heating Power Sources, Coolers, and Electronic
 - Controls/Recorders
 - * Water Coolant Systems (Non-Integrated)
 - * Flowgauge and Flowmeter Regulators (No Labor)
 - * HF Units
 - * Grids
 - * Spot Welders
 - * Load Banks
 - * Arc Stud Power Sources & Arc Stud Guns
 - * Racks
 - * Running Gear/Trailers
 - * Plasma Cutting Torches (except APT & SAF Models)
 - * Field Options
 - (NOTE: Field options are covered under True Blue® for the remaining warranty period of the product they are installed in, or for a minimum of one year whichever is greater.)
 - * Bernard-Branded Mig Guns (No Labor)
 - * Weldcraft-Branded TIG Torches (No Labor)
 - * Subarc Wire Drive Assemblies
- 4. 6 Months Batteries
- 5. 90 Days Parts
 - * MIG Guns and Subarc (SAW) Guns

- Induction Heating Coils and Blankets, Cables, and Non-Electronic Controls
- * APT & SAF Model Plasma Cutting Torches
- Remote Controls
- * Accessory (Kits)
- * Replacement Parts (No labor)
- * Spoolmate Spoolguns
- Canvas Covers

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